THE AMERICAN BREEDERS MAGAZINE

"Compared with him who has the power to conceive an ideal animal form and call it into life, through a profound knowledge of nature's intricate and hidden laws, the greatest sculptor is a mere mechanic."—A. H. SANDERS.

Vol. III **Third Quarter, 1912** **No. 3**

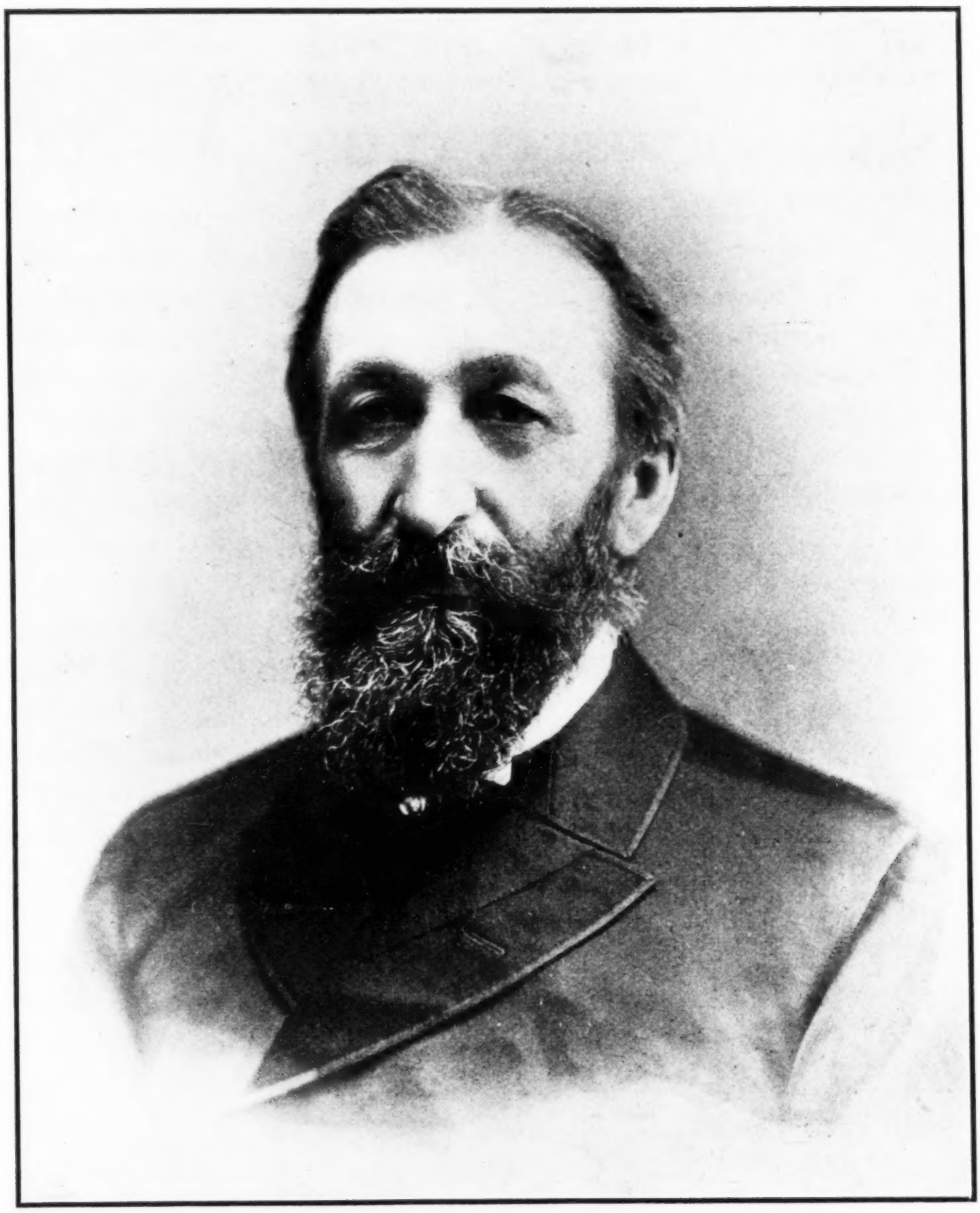
NEHEMIAH PARKER CLARKE, 1836-1912

Nehemiah P. Clarke of St. Cloud, Minnesota, one of the strongest breeders of pedigreed live stock in the United States, died on June 29, 1912. Interested primarily in merchandising and lumbering, Mr. Clarke gradually developed his talents as a breeder of live stock until this became his main business. The *Breeders Gazette* truly says of him: "As a constructive breeder of draft horses and beef cattle, it is doubtful if this country has produced his superior."

The pioneers in breeding as in every other calling, have filled a large place in American life. In nearly all cases they have been self-made men who have won because of sheer force of personality, and because of peculiar fitness for their especial business. We have no better example of this kind of live stock pioneer than Mr. Clarke. His achievements are not as well known as they would have been had he done his work more nearly in the center of the great live stock region of the middle west. He was located in the northern zone of live stock business, but in spite of that fact won not only a national but an international reputation as an importer and especially as a breeder of several classes of pedigreed animals.

While he bred other classes of live stock, his chief reputation came to him through his Shorthorn cattle, Clydesdale horses and Galloway cattle. For many years, in each of these three lines, he had kept on his three farms near St. Cloud among the largest and very best groups of females to be found in this country.

His Columbian World's Fair winnings in Clydesdale classes from his Clyde Mains Farm first attracted attention to Mr. Clarke's ability in assembling and breeding live stock. During later years the winning at The International Live Stock Expositions of international herd championships for Shorthorns, bred on his Meadow Lawn Farm, again emphasized the fact that Mr. Clarke had built up a great breeding establishment. His achievements in building up a splendid herd of Galloway cattle stood only second to his work with Clydesdale horses and Shorthorn cattle.



NEHEMIAH P. CLARKE

One element of Mr. Clarke's ability as a breeder was shown by his leaving the splendid collection of stock he had built up, in the hands of those who can continue the brilliant work he did in his life, so that the blood which he had assembled should be kept as a constant wellspring of new value to be multiplied and distributed to those who produce live stock. Too many of our breeders gain a state-wide or even a nation-wide reputation for herds which contain splendid individuals, and are splendid in their usefulness in producing breeding animals for sale, but at the death of the breeder the herds are dissipated.

Equal to, if not greater than Mr. Clarke's public service as a breeder was his work in connection with the development of agricultural organizations in his state. As President of the State Agricultural Society a third of a century ago he was the leader in securing and building up the magnificent State Fair Grounds between Minneapolis and St. Paul. In his work of organizing agricultural institutions Mr. Clarke was long associated with Mr. J. J. Hill. It was largely through their influence that the branch experiment stations and agricultural high schools were extended throughout Minnesota. Mr. Clarke was one of the leaders who stood for the establishment of the first agricultural high school in this country, at St. Anthony Park on the Minnesota Agricultural College Farm. He was interested to the end, in all measures to put forward the education of farm youth and of the mature farmers. He was a powerful factor in inducing the authorities to build up agricultural as well as general education for the farm youth of Minnesota. He was one of the most vigorous of those American business men who have aided the newer education to break away from the old academic learning of a third of a century ago. There should be placed for him a statue at Minnesota's University Farm, that those who reap the benefits of his life may know of his work as a breeder and as a worker for country life betterment.

Mr. Clarke was born in Massachusetts in 1836. He went west and, after a brief experience in Fond du Lac, Wisconsin, entered the mercantile business in St. Cloud, in 1836. He was long engaged in the transportation of government supplies between the Mississippi River and the Black Hills and for many years was extensively engaged in lumbering. During the last thirty years he gradually withdrew from most of his other enterprises and devoted himself to his three farms with their herds of pedigreed live stock. W. M. HAYS.

THE ILLAWARRA BREED OF DAIRY CATTLE

FRANK MCCAFFREY

Kiama, New South Wales, Australia

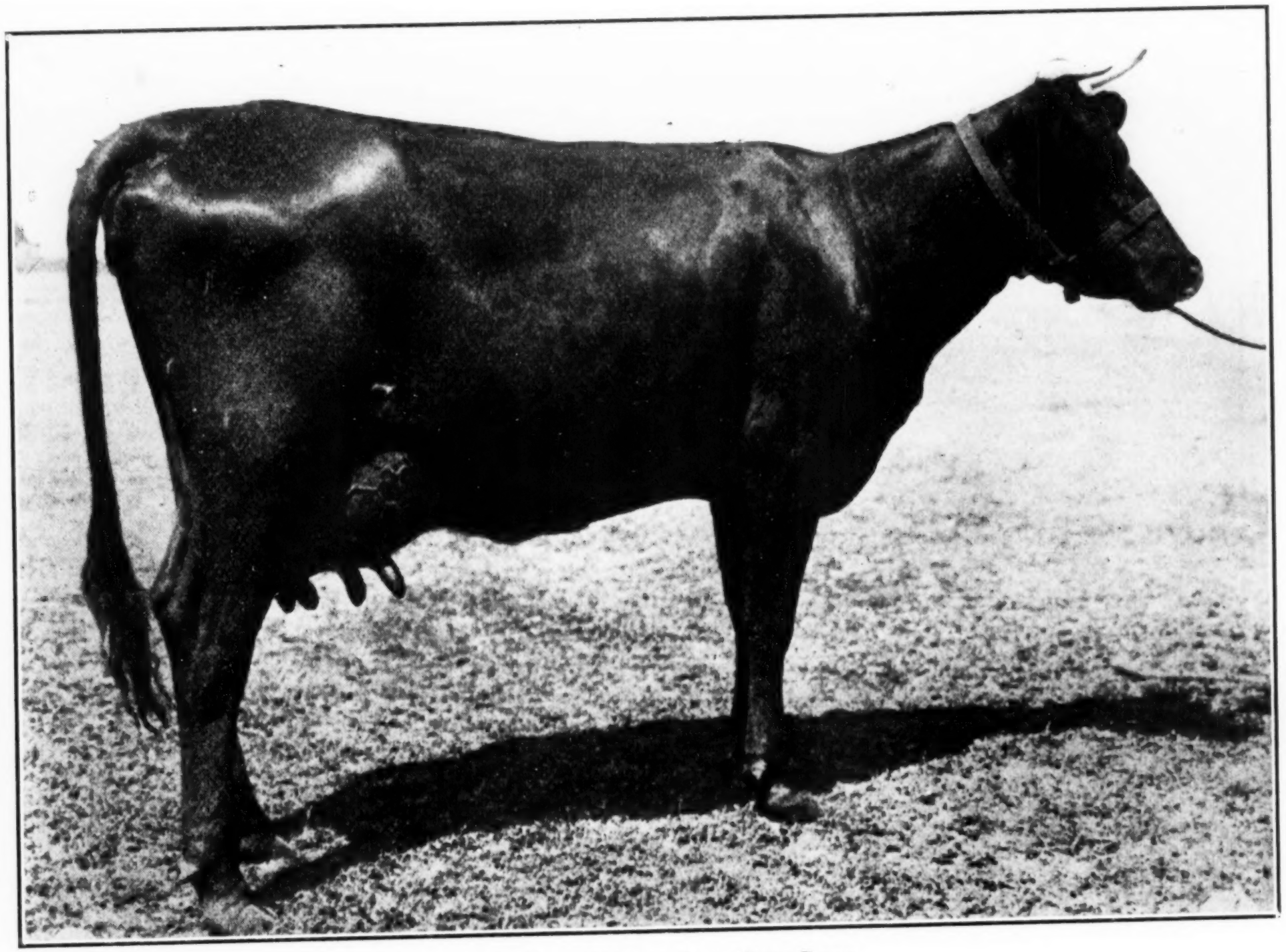
Illawarra, New South Wales, embraces the eastern portion of the County of Camden, and the northern portion of the County of St. Vincent; bounded on the north by a line west to the head of the Cataract River, commencing on the sea shore near Bulli; on the west by the Illawarra range, thence straight to the middle source of the Kangaroo River; thence by that river to its confluence with the Shoalhaven River to about 2 miles south of the Warreamungo; on the south by the range north of Endricko River to the source of Yalmal Creek and again by a range to Lambe Grant—(Jervis Bay); and by the eastern shore of St. George's basin to Sussex Haven and thence by the sea shore, which forms the eastern boundary to Bulli, as aforesaid. The eastern face of the Illawarra range consists of numerous gorges.

Illawarra is a beautiful, fertile, romantic district between 50 to 90 miles from Sydney, covering about 250 square miles. The Illawarra Mountain is a lofty and precipitous range running parallel to the coast, and supporting the elevated table-land to the westward. Looking from the mountain toward the sea the views from a hundred different outlooks are indescribably beautiful and magnificent. The district proper consists of a belt of land enclosed between the mountains and the ocean, increasing in breadth to the southward. It was originally thickly wooded, and for the most part exuberantly fertile. In a word, nature did everything possible for Illawarra, on which mankind has lived without doing anything in return for upwards of eighty years. Baron Hugel, an Austrian gentleman, who resided some time in New South Wales, devoting himself to scientific research, observed that the scenery and vegetation of Illawarra strongly reminded him of scenes he had visited in the interior of Ceylon. Kiama, the center of the dairy industry in Illawarra, is situated 90 miles by road and 70 miles by railway south of Sydney.

The origin of our Illawarra dairy cattle takes us back to the year 1816. Illawarra was then in its virgin state just what a man of science would keenly appreciate, a display of natural harmony, unity in a multitude of variety; the delicate balance sustained for the time being by the addition of the very best strains of horses

Flower, I. D. C. A. Herd Book.

This cow can be traced forty years in direct line from the Evans & McGill strains of dairy cattle.

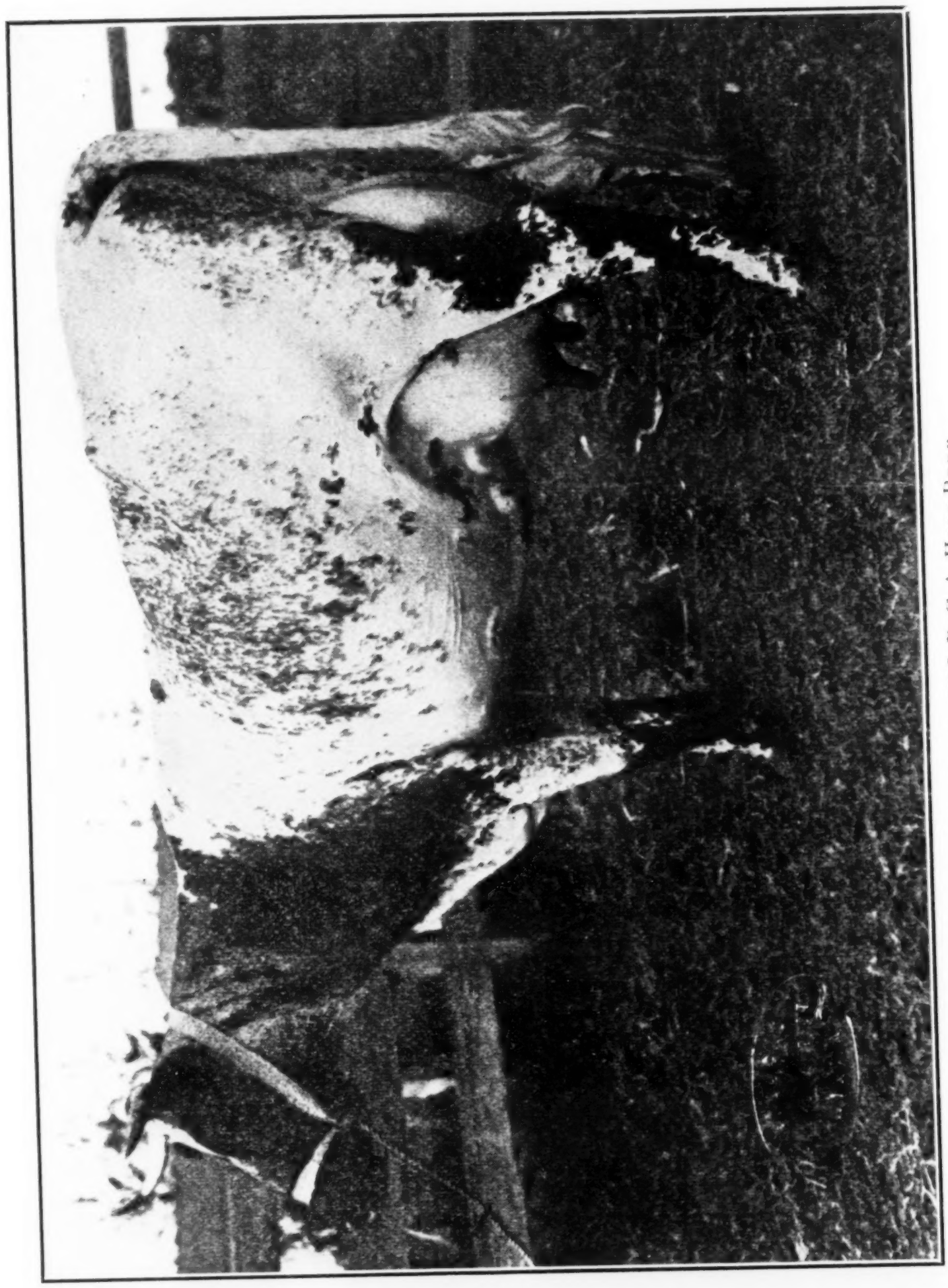


MILK MAID, 225 I. D. C. A. HERD BOOK.

Official one-day test: Morning, 36.50 pounds milk; 4.3 per cent butter fat. Evening, 35 pounds milk; 4.9 per cent butter fat. Commercial butter per week, 25.75 pounds.

and cattle that money could purchase in England. Prior to 1816 Major Johnson, Captain Macarthur, Dr. Throsby and Messrs. De Avey Wentworth, James Badgery, Robert Jenkins and others received grants of land from the government together with stock and convict servants in the vicinity of Sydney. The success of these early experiments was phenomenal, and stock of all kinds increased and multiplied in numbers and quality beyond all expectation. The second duke of Northumberland sent this friend, Major Johnson, a great gift of breeding horses and cattle. Major Johnson had obtained on the banks of the Macquaria Rivulet which empties into Illwarra Lake a grant of land that consisted of rich alluvial flats and sloping open ridges, known as open forest land. No better country could be selected in Australia for a stock farm. The other gentlemen just mentioned quickly followed Major Johnson with stockkeepers, surveyors, timber getters and herds of breeding animals. Hence by the time the mid-twenties of last century were reached, there were in Illawarra valuable herds of Durham, Longhorn, Shorthorn, Hereford, Devon, Holderness, Red and Dun Colored Polled, and Ayrshire cattle all doing well and increasing and multiplying by hundreds annually. Very little change took place in the system of cattle raising during the next twenty years. Here the stud animals were bred for the fast increasing inland stations. Many men with capital had settled in Illawarra just prior to 1840, when a flood of immigration set in which displaced the convict system of the past. This period marked the beginning of dairying in Australia, as an industry, and it is from this date that Illawarra men date the foundation of their breed of dairy cattle.

Having watched the several developments in dairy cattle breeding in Illawarra for a period of fifty years, I can safely say that many of our best types of cows and bulls appeared to be mere accidents of birth. Notwithstanding all that human art has done in the past, soil and climate seem to have been favorable to the production of a distinct type of dairy animal. So much perplexity surrounded every scheme of breeding and mating dairy cattle, from any point of view that, from the moment I grasped Mendel's Laws of breeding to this day, I have done naught but reflect on the breeding of our best families of Illawarra dairy cattle. For example, take the breeding of the tall and dwarf peas as explained by Mendelism. In Illawarra as long as I can remember we had a tall lengthy well-developed family of cattle. These cattle were evolved from crosses of the old Longhorned breed with the Shorthorn. They



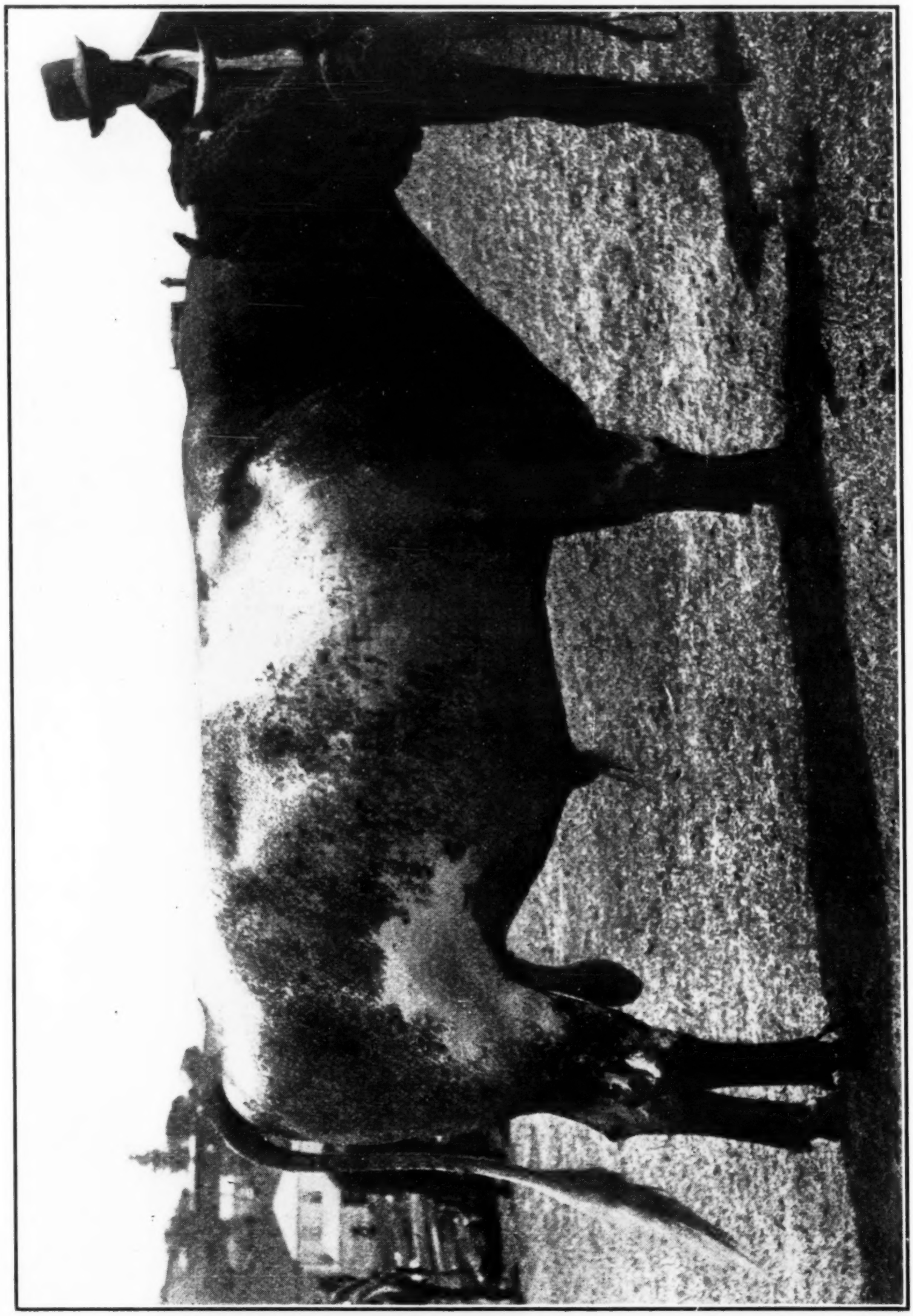
PINK PEARL, 269 I. D. C. A. HERD BOOK.

Official one-day test: Morning, 38.5 pounds milk; 4.2 per cent butter fat. Evening, 38.6 pounds milk; 4.8 per cent butter fat. Commercial butter per week, 28.14 pounds.

were called Longhorned-Durham and were mostly of a strawberry color. They were splendid dairy cattle, perhaps rather coarse in the bone, and standing high off the ground. At one time there were thousands of this type of animal in New South Wales. Contemporary with that there was to be found in perhaps greater number a low-set red dairy cattle, evolved from crosses of the Devon and Ayrshire breeds. Now, I contend that by mating those two distinct and to some extent opposite types of cattle, we have produced our best strains of dairy cattle by striking a happy medium. This however must be borne in mind: Productiveness and udder formation has been the aim and object of our Illawarra dairymen for upward of seventy years. With regard to putting udders on their female progeny the imported English Shorthorns have been lamentable failures in Australia during the last forty years; hence the formation of the Illawarra Dairy Cattle Association which has for its object the preservation and conservation of the remaining types of the old strains of cattle. We think that when the dairymen come to understand the practical application of the laws of heredity, good results will follow. No doubt many of our most successful dairymen have been working for years on the simple plan of selection and crossing with the best types of the Shorthorn and Ayrshire breeds and it goes without saying that there are crosses of various kinds being worked into the modern milking types of both these breeds.

These methods were carried too far in Illawarra about thirty years ago and many dairymen became possessed of the pure Shorthorn craze and purchased station-bred Shorthorns and used them in their herds which procedure resulted in loss of udder capacity among their progeny, combined with other undesirable characteristics. Notwithstanding the great disaster wrought in our dairy herds by the introduction of those pure bred Shorthorn bulls there are still some of our dairymen to be found clinging to the "Flesh Pots," simply because the progeny of these beef bulls which have had pure Ayrshire dams look well in the show ring, and occasionally sell well. Dairy farming is not carried on in Illawarra for the mere sake of breeding show animals, it has an end beyond that. We may therefore anticipate that when Mendelism comes to be fully grasped by our Illawarra dairymen they will become its devoted students. Much of the every day observations on the farm confirm its simple rules and this will quickly appeal to common sense.

If we now turn from the science and the art of breeding to the purely practical, we may still see that beauty of form consists in the



WARRIOR, I. D. C. A. HERD BOOK.

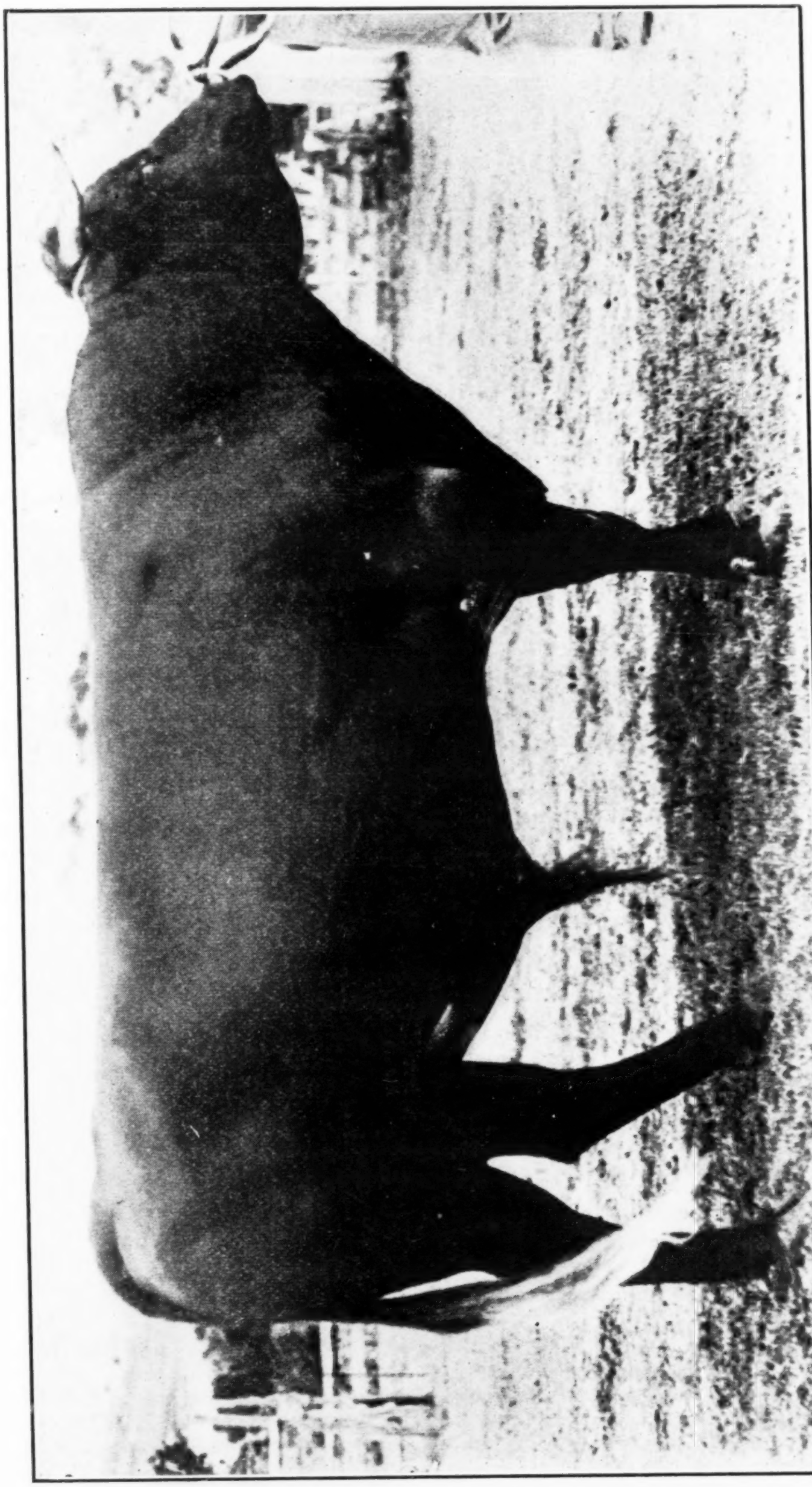
harmony and happy proportions between the several parts of an animal's mechanism. With regard to the udder formation of the Illawarra dairy cow there may be difference of opinion; but all breeders are agreed that as far as its productive functions are concerned, it is as pure bred as the wool on the back of a Merino sheep. With regard to body conformation or type, difference of opinion seems also to exist; yet all are agreed that the most economic type of cow for dairy purposes is what is termed the wedge-shape animal. Views regarding color vary according to the breeder's fancy, but generally speaking the lighter shades of any color or blend of colors are the most preferred. The photograph accompanying this article were taken of animals in the vicinity of Kiama, my native home, with the exception of Warrior which we sold from the Illawarra district some years ago. Too many valuable dairy animals are removed from places of usefulness at tempting prices by buyers who have no practical knowledge of dairy cattle breeding. The photograph of Warrior was taken in Queensland on a farm to which he should not have been taken.

With the oncoming of the great advance in knowledge of the principles of breeding as laid down by the adherents of Mendelism, we will no doubt soon see a much larger percentage of these high class dairy cattle, whose photographs accompany this article, than it has been our good fortune to raise. Instead of looking at these almost ideal animals as being so many accidents, we will become accustomed to look upon the waster as an accident of birth. Unfortunately the great mass of dairy farmers are too busy on their farms to do much reading, hence new ideas progress slowly.

Our cattle could not be registered in the English Shorthorn herdbooks—they are not of that type. They are of the English Shorthorn type that existed in England prior to 1870. That is to say, they are Shorthorns that carry little or no beef and possess plenty of size without being large boned. Our cattle are descended from the English Shorthorn of the thirties and forties of last century. Therefore, they could not be entered in Coates' herdbook.[a] They will not carry the beef and that is what the English herdbook was originally established for.

[a] In the *Journal of the Board of Agriculture*, September, 1910, p. 447, The Coates Herd Book is described by Mr. A. T. Mathews, as follows:

"A very great step in advance was taken when, after much persistent advocacy by Mr. Richard Stratton and others, the Shorthorn Society commenced in 1901 to give prizes for milking Shorthorns, although in so doing no definite aim was claimed. The movement served the great purpose of setting certain breeders to think, and in 1905 they formed a new society, called the "Dairy Shorthorn (Coates's



TOGO, No. 1, I. D. C. A. HERD BOOK.

Nor could they be registered in the American Shorthorn herdbook if that is based on the same lines as the modern English herdbooks.

We have a strain of cattle here that have been bred exclusively for milk and butter production for seventy years back. To my knowledge, there have not been any records made as to the cost of producing milk and butter; at any rate not in the sense that experiment stations conduct such tests. Our dairymen are nearly all rent payers. Rents are very high in Illawarra, running in some instances as high as 2 pounds ($9.72) per acre per year exclusive of taxes, rates, etc. We have the landlord system with us.

The dairymen know the breed and types of cattle that pay the rent, and they have held fast to them through all ills and will no doubt continue to hold on to them, improving them as they go along. Our breeders claim that our cattle are the original types of Shorthorn and that generations of feeding have produced the beef types. However, we are all living in hope of better results later on when the older worlds have solved a few of the many vexed questions in heredity —and found clues to the tangled facts of the causes of variation.

In conclusion I desire to convey my appreciation of the splendid efforts of the American Breeders Association and those who have contributed in the past to its publications. My wish is that their efforts may be crowned with success.

Herd Book) Association." Very wisely the founders of this body refrained from starting a separate Herd Book, which would have served no good object, but might have had the effect of splitting the Shorthorn interest into two distinct sections. Their object was not to introduce a cleavage in the Shorthorn ranks, but to restore the reputation of the breed as general purpose cattle, and incidentally to meet the growing national demand for milk."

The above article by Mr. Frank McCaffrey sets forth an ideal condition under which to carry forward to very great success some form of coöperative circuit breeding, such as is being developed in this country. These Illawarra breeders have an ideal basis in the hybrid product, after several generations of intercrossing the Shorthorn, Ayrshire, and other stocks of British cattle. This product naturally varies greatly with families and with individuals within the family. Having been bred by men who are under the necessity of making their money largely out of dairy products, combined with beef, doubtless very much of the unfruitful recombinations of the hybrid stocks have been discarded. Doubtless among the splendid families now in the hands of these breeders, there are occasional individuals and even families with very great power to project high "dual purpose" excellence into their progeny. The governments of Australia and of New South Wales could do no wiser thing in the interests of agriculture, than to thus coöperate in providing the expert assistance needed in establishing in the counties of Camden and St. Vincent, a breeding circuit similar to those being developed by the United States Department of Agriculture in coöperation with the State Experiment Stations.—The Editor.

A HISTORY OF THE ARABIAN HORSE AND ITS INFLUENCE ON MODERN BREEDS

F. KNORR
Mitchell, Nebraska

The origin and early history of the Arabian horse is shrouded in a maze of myths and legends—some as charming as fairy tales. Many who have written about this breed of horses have given one or the other of these wonderful stories currency as fact, and have thereby perhaps led the attention away from the real individuality of the horse itself. The Arabian horse does not need the assistance of legendary lore to prove its superiority. The facts of history, and the real worth of the breed as we know it today, are sufficient to secure for it the recognition it deserves.

There is a tradition in Arabia, that all of the pure-blooded Arabs trace their ancestry to five mares. These five mares were owned by Sheik Salaman, who was the fourth descendant from Ishmael, and lived about 3000 years ago. These five mares fell to him as a dowry upon his father's death; he complained about his inheritance, but after being told that he received the greatest wealth that the land possessed he was satisfied. In time these mares foaled, and thenceforth the drove increased rapidly, and developed into the most wonderful breed of horses man ever saw.

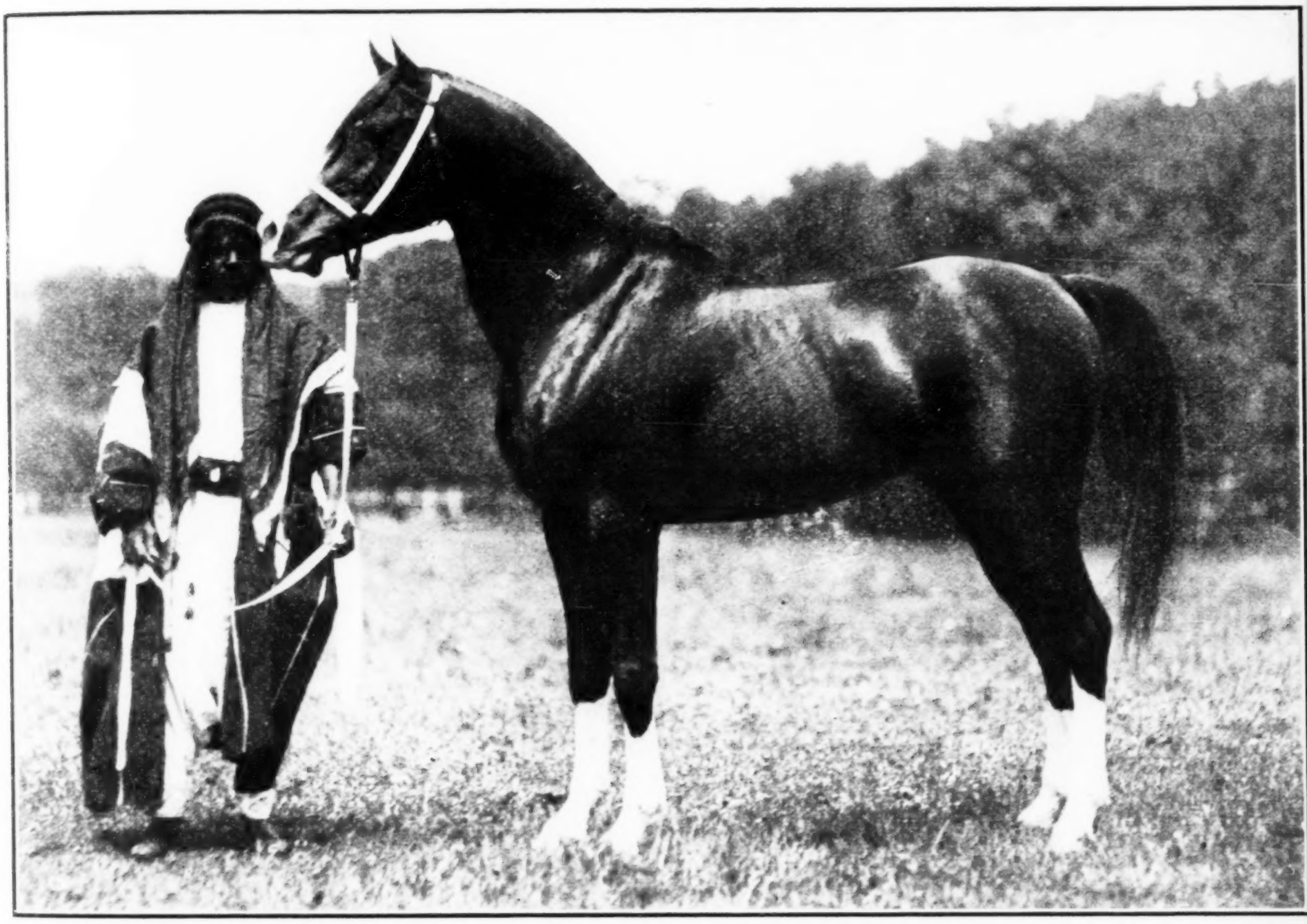
Another legend has it that a certain prophet selected the best mares that could be secured in the land; these were enclosed in a corral within sight of feed and water, but both of these were withheld for several days. When the gates were opened the mares made a wild rush for water and feed; just at that moment the war bugle was sounded: five of the mares, half starved and famished for water, halted, turned to their master, and were ready to carry him to battle. These mares are supposed to be the ancestors of the present Arabian horse.

A third story relates that the Arabians trace the ancestry of their horses to those with which Mohammed made his escape to Mecca. But recent investigations by Count De Canteleus show that instead of escaping on horses, Mohammed at that time had only several camels.

One legend refers to only one mare as the foundation animal. A certain Sheik was pursued by the enemy. While taking a rest by the wayside his mare gave birth to a colt. Being hard pressed

he left the colt to its fate and continued his flight. The Sheik reached camp in safety and after several hours the colt came running into camp and this mare and colt were the foundation animals of the breed.

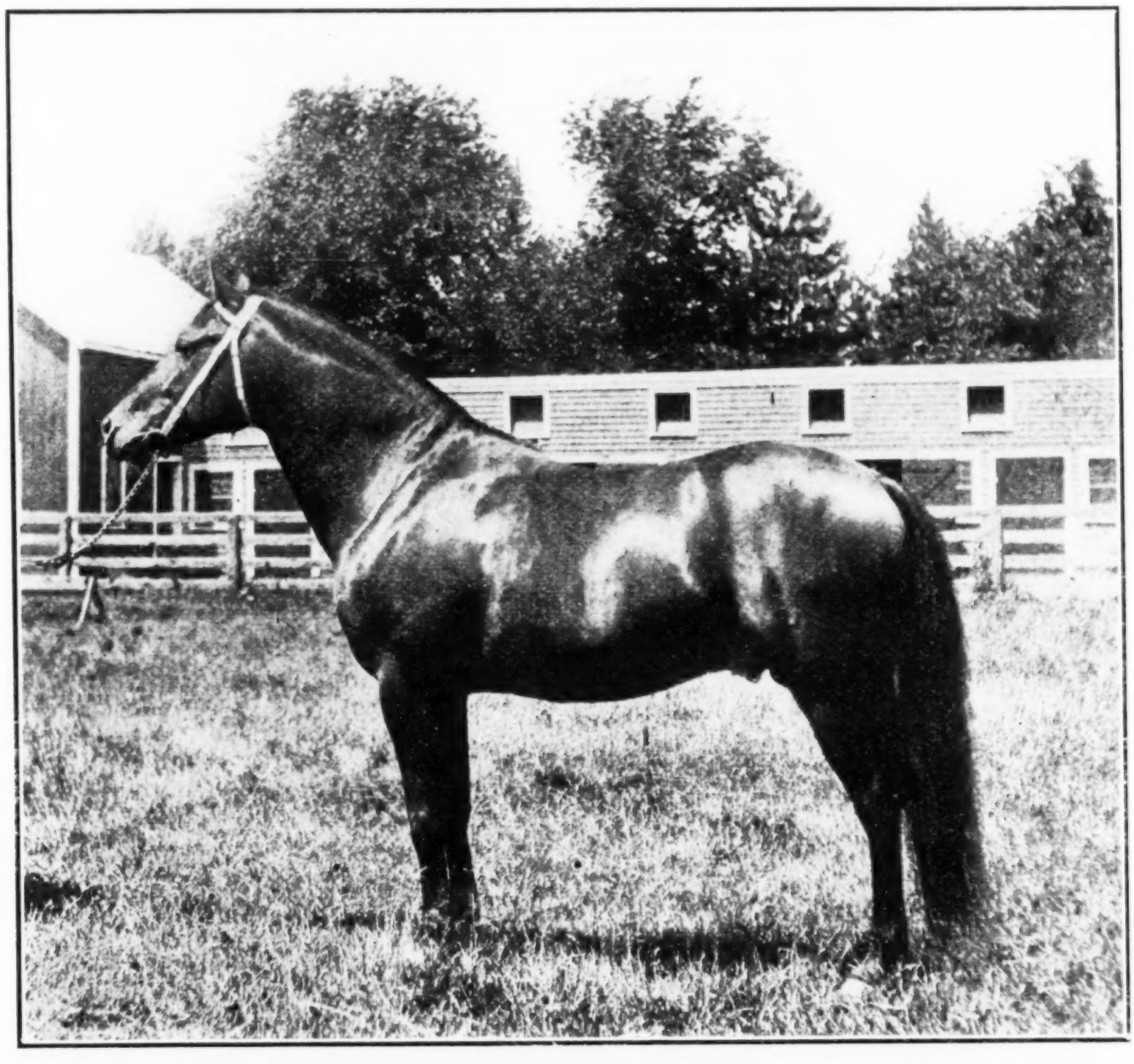
Historical research has brought to light some facts which entirely discredit all the legends. They do not show the use of the horse so early as usually stated. Many writers on the Arabian horse



IBU MAHRUSS, A. N. G. B. No.22.

give its existence as early as 1635 B.C. We cannot find any reference to the horse outside of Egypt until Solomon's reign in 1015-975 B.C., and even at that time all of the horses were recruited in Egypt. We well know that in early Biblical times the ass was used as beast of burden almost exclusively, and even at a later day the wild ass is accredited with a greater speed than the horse. A nomadic tribe of Aryan origin pushed out from the mother tribes during one of their periodic migration waves, came drifting from the north, to the plateau southeast of the Caspian Sea, where they

settled and founded Media. Just when they came to that land is not definitely known but it was previous to 625 B.C. These Medians soon became known for their beautiful horses, that were "as swift as the wind." Horse racing was one of their pastimes and it attracted many people form other lands. Previous to this time the Olympian games at Athens had not included chariot racing but about



ANTAR, No. 37 A. N. G. B.

650 B.C. the chariot race for the first time played part in those games, but with horses brought "from other lands." Where the Medes secured their horses is not known. They may have brought them from their original northern home, but there are strong reasons for the supposition that these horses were the native wild horse of Media and Mesopotamia and that they were there captured and domesticated. When Naboplassar revolted in 625 B.C. and made alliance with the Median King Cyaxares, the fusion of the armies brought

the Median horse to the south. Later when Nebuchadnezzar (604-561 B.C.) extended his territory and built Babylon, subdued Jerusalem, and began the siege of Tyre, he brought the Median horse with his army into Syria. At this time horses were almost unknown in Phoenicia. The Phoenicians were the greatest merchants of that time; their ships and caravans were known everywhere, yet all their land traffic was with camels. We find these merchants trading with the Arabians, securing from them gold, spices and oils, but in no instance do we find records where they traded their goods for horses.

When the Medes were finally conquered by the Persians in 558 B.C., and were later again taken from the Persians by the Greeks under Alexander in 334 B.C., the rapid spread of the horse began, and we have every reason to believe that Alexander introduced the Arabian horse into the lands he conquered. Herodotus, the first accurate historian whom the world had, states: That so late as 450 B.C. Arabia could not contribute any horses for Xerxes' armies, but gave many camels. If the Arabians had had horses at that time, Xerxes would certainly have procured them and the historian would have noted the fact.

Some writers attribute the hardiness of the Arabian horses to the adverse conditions under which they have been reared for these several thousand years. We well know, however, that it is only the best environment that brings out the best qualities in man and beast. High excellence in animals cannot be produced under unfavorable conditions—in fact, they deteriorate rather than improve. How then can we accredit the desert, the sun-parched plains of Arabia to be the home of the beautiful Arabian horse? All indications point toward the grassy slopes and the foothills of the Caucasus Mountains, where physical conditions are so similar to those we have along the foothills of the Rockies where a dry climate and moderate rainfall make good pasture but without the tendency to make a soft, spongy hoof. Captain Upton in *Frazier's Magazine* (1876) says: "The best breeding is not on the peninsula of Arabia, where the water is only to be had from wells, but rather in Mesopotamia, and the great pastoral districts bordering the Euphrates." All this evidence leads up to the idea that the term "Arabian" horse is a misnomer, for the breed was fully established before it was introduced upon the plains of that land. That there is a gradual deterioration taking place in that breed of horses upon its new and foreign breeding ground, is proven by the improvement which the Arab is undergoing in this country in the hands of our best horsemen.

The Arabian horse has played no small part in the development of all of our breeds of horses; the blood lines of all of our best stock trace back to some Arab or Barb. The race horse, trotter, saddler, coach, and draft horse all have some Arab blood in their veins. It is often said that this Arab blood, used so long ago, can leave no

ABDALLAH, No. 52 A. N. G. B.

trace at the present time, and that for speed the American horse is a far superior animal. It matters not how long since the Arabian blood was infused. It was the foundation stock in the development of the horse and it gave us the animals that we now have. An authority has this to say on that subject:[a]

[a] *The Horse of America*, by Frank Forrest, vol. i, 1857.

And though it can scarce be doubted that, in the very commencement of turf-breeding there must have been some mixture of the best old English blood, probably in great part of Spanish by descent, with the true Arab or Barb race, the impure admixture is so exceedingly remote, not within fourteen or fifteen generations that the present race-horse of England and North America cannot possess one sixteen thousandth part of any other blood than that of the Desert.

It is a long time since the horses Messenger, Diomed, Mambrino, Justin Morgan, Bashew, Spark, Selina, Blaze, Fearnaught, Traveller and Ethan Allen lived, yet our best stock traces back to them. Without Justin Morgan there would be no Morgan horse; Justin Morgan was rich in Arab blood. Messenger and Diomed, the progenitors of the American running horse were of like parentage. The beautiful coach horses known as the Hackney trace their lineage to the Arabian breed. At Fort Collins, Colorado, where the Department of Agriculture is now trying to perfect a new type of carriage horse, there is at the head of that stud, Carmon, who carries in his veins the blood of the Arab. The powerful and massive Percheron, whose weight at times exceeds a ton, is, in spite of its ponderous size, not without grace and has certain lines of beauty, both of which it owes to the Arab lineage which has removed that coarseness which prevails with many breeds of draft horses.

Many horsemen make a distinction between the Arab and the Barb, when in fact the difference is but slight. The Barb is more often spoken of as inferior, yet in spite of this it is generally admitted that the Barb has the better knee action of the two. The horses of Spain are Barbs with a strong admixture of the best Arab blood. Captain Upton wrote that not a single specimen of the Seglawi Jedram breed, for which Mesopotamia was once so famous, can now be found there. The Mohammedans when they moved westward secured much of the equipment for their army in that country, and no doubt appropriated most of its stock. They brought these with thousands of other Arabian horses to the Spanish Peninsula. When they were driven out of Spain many of the horses remained and these together with the Barbs, contributed to the foundation of the Spanish breed of horses now known as Jennets.

The late Mr. Keene Richards spent much money in importing and training the Arabian horses for racing purposes, and it was unfortunate that just when results might have been expected the Civil War dispersed his stud. However, his stock had its influence on the horses of Kentucky, and their blood can be found in many of

the best pedigrees of the horses of today in that state. While some pure-bred Arabs have been great race horses it is not for short distance racing that they should be tested. Put him, however, to the severest long distance tests and to continuous daily hardships on short rations of food or water, call on him for that emergency reserve which may be the salvation of life, and his equal will not be found. Grant him first place for weight-carrying and as a general purpose horse and then mere speed assumes a place of minor importance. As motor machines do more and more of the drudgery that heretofore has been performed by horses, this noble animal comes to occupy his original position in the world, that of the joy and companion of man in times of peace, and a most valuable and dependable servant in times of war. His superior intelligence gives him first rank for service and use. His beauty is an asset of much greater value than mere speed and it is his intelligent personality that goes to the heart of every one who is fortunate enough to become the owner of an Arab horse.

When horses will be bred for these highest uses and not for gambling purposes then the Arab horse will become more and more the favorite of horse lovers, and the public at large will be educated to appreciate and value this breed. And in the same manner as the English Thoroughbred and the American Trotter are superior to their Arab ancestors for the special purposes for which they have been bred, so the pure Arab, as he is now being bred in this country, for the qualities which especially characterize this breed, will make the Arabian horse of America the best in the world.

CONCERNING THE FAT-TAIL AND THE BROAD-TAIL SHEEP

C. C. YOUNG

Belen, Texas

This comprehensive treatise concerning the fat-tail breeds of sheep of Asia is most suggestive. This is a most emphatic illustration of the fact that there is needed a comprehensive campaign in animal introduction into this new continent, similar to the campaign now being carried on in the introduction of seeds and plants. The campaign must be accompanied by the utmost preparation and care to avoid admitting such animal diseases as we do not now have but which would jeopardize our entire live stock industry. Dr. Young's enterprising work should be encouraged in all legitimate ways. It were better that both public and private agencies work in this new field of developing fur and mutton breeds of hardy sheep. No one is more sensible than the editor of the fact that the worst which could happen to Dr. Young and his infant industry would be that this kind of sheep breeding should become a fad—even a shadow of the Belgian Hare fad. As to whether there is profit in these sheep in a commercial way only time can tell. Estimates of high priced rare skins are not quotations on commercial lots. This, as every other industry, needs to grow slowly and conservatively, until commercial quantities have proved out the profitableness and the stability of the industry.—THE EDITOR.

In an article which appeared in the *American Breeders' Magazine*, vol. ii, no. 1, 1911, the writer called the attention of the breeders to the fur bearing broad-tail Karakul breeds. It is intended in this article to correct certain statements which were then made in reference to the big Karakul class. Whilst the description of the exterior of the big Arabi, so far as its habitat is concerned, was correct we were mistaken somewhat as regards the weight, which does not exceed that of the Lincoln sheep. The heaviest of all sheep in Asia belong to the *Ovis steatopyga* class which has an average weight of 250 pounds and belongs to the Kamolaja Koordiutsnaja kind.

The literature that deals with this sheep is not extensive and Russian authorities do not have much to say about it except that it is a very hardy desert animal possessing most excellent mutton and fat, but produces only fair fur. At present a commission authorized by the Russian Department of Agriculture is collecting data regarding this remarkable sheep, as well as other broad-tail and fat-tail varieties, and before very long we expect to have something more to say on this subject. This sheep crossed with our Lincolns ought to give us the kind of a broad-tail that we alluded to in our former article, and as but little Karakul pigment is required in order to produce an excellent fur, thanks to the wonderful luster of our Lincolns, Cotswolds, Wensleydales, and especially the Leicesters and Dartmores, we should have little trouble in producing the heaviest fur bearing broad-tail in the world, even if it became necessary to inject more Karakul pigment than an off-spring would possess resulting from a cross between a Kamoloja and a Lincoln, for instance.

There are about thirty different varieties of broad-tail and fat-tail sheep and yet practically nothing has been written on this subject by English writers, with exception of Prof. Robert Wallace of whom we will speak later in connection with the broad-tail sheep of Cape Colony. Some of the literature on these sheep has been translated from the Tartar, a few German writers have also contributed valuable information in a general way, but the classification seems to have been made almost entirely by such Russian naturalists as Sinitzin, Perepelkin, Kooleshov, Poniatovsky, Ivanaev, and others. We can especially recommend the well illustrated books of the first and third of these writers. No attempt has so far been made by any one to translate these works into the English language, a task which the writer has taken upon himself to perform. Another trip through Central and Asia Minor will be necessary before we are satisfied with certain classifications and can unhesitatingly state that we are of the opinion that the small Karakul, which should properly be called Arabi, is the original *Ovis platyura* from which all other sheep of the same class, as well as the *Ovis steotopyga*, are descended.

Whilst all Russian writers practically agree with Sinitzin, who today is considered an authority, that the Shirazi, Doozboy, Malitch, Tartarskaja-Tooshinskaja, Groozinskaja, Osetinskaja, Sokolskaja, Resheteliovskaja, Bessarabskaja-Tshooshka are grade Arabis, this cannot be said to be the case when it comes to the *Ovis steotopyga*. The stand which we took that this sheep is also a grade Karakul which owes its great hardiness and wonderful fat accumulating properties and black pigment to the Arabi, will be contested by certain authorities, who apparently believe that the fat-tail sheep is of different origin, chiefly so, on account of its very short tail consisting of only three to five vertebrae, and the peculiar position of the fat pillows covering the buttocks. We have observed a great variation in the size of the tails of the grade Karakuls, dependent entirely upon whether the non-Karakuls possess a short or long tail, and we think we are right in our assumption as expressed in the following pages of this article, but admit that there are several anatomical puzzles that we are unable at this time to answer, and we desire to state that for the present Natusius and Bom may be justified in their classification. Some broad-tails unquestionably have become mixed with the fat-tails and the proofs offered by Bom in the case of the Zigai is quite sufficient.

A number of preliminary experiments have been conducted by the Department of Agriculture at Washington, D. C., as well as by

various breeders, indicating that we can not only compete with Asia when it comes to the production of such grade Arabi pelts as are known on the market under the trade name of Persian Lamb, Astrachan, Krimmer, Afghan (called Caracul in this country), but that we can excel that country greatly and with much less Karakul blood. Quarter-blood Karakul-Lincoln skins have been produced in Texas equal in luster and tight curl development to the best of the so-called Persian Lamb skins, and as for the half-blood Karakul-Lincoln pelts, there is nothing Asia can produce that can compare with them. That proved to be the case, however, only where necessary precaution was exercised in the selection of our American long-wool ewes with the most luster. Some skins in this case were valued by wholesale furriers at $10 each, and when one considers that in the southwest at least two such skins can be produced annually from a ewe, one can get some idea of the importance of this industry to our breeders.

There is but little difference between the half-blood and quarter-blood Karakul-Lincoln skins, the value as breeder depending upon the luster and tightness of the curl at the time of birth. It has been demonstrated that we cannot produce a marketable fur in the first cross unless we confine ourselves to the lustrous long-wool sheep, although good results have been obtained where half- and three-quarter bred Lincoln-Shropshire ewes have been bred to half-blood Karakul-Lincoln rams, the skins having been priced as high as $6. The writer has one skin produced by Allbright from a half-blood Karakul-Shropshire buck and a three-quarter bred Lincoln-Shropshire ewe which is very pretty indeed, and while not yet priced, it should be easily worth $5. Where Karakul bucks are employed that are free from Afghan blood (tight-wool) we do not have to use full blood long-wool ewes in order to produce $10 skins and the same thing is true of the half-blood Karakul bucks, providing, however, that such rams have no tight-wool admixture.

Very satisfactory results indeed were obtained on the ranch of the Middle Water Cattle Company, and this is remarkable indeed, as the ewes possessed considerable of tight-wool blood, which to a certain degree was overcome by the presence of Karakul blood in them. These ewes are known in this country by the fancy name of Persian broad-tails, which at the best are half-blood Karakul-Tight-wools, as we will explain later when we go into the question of Persian Broad-tails and Persirianos. Some of these skins were priced by an expert at $9, and the lambs from which these pelts were obtained

came from Persian broad-tail ewes sired by the two best bucks of the original herd of fifteen which we brought to this country. We were indeed surprised to find that some of these skins were in every way equal to half-blood Lincoln pelts, which only serves to prove that a certain amount of tight-wool blood can be overcome, providing as already stated, the full blood Karakul rams are free from the tight-wool taint. On our own ranch we learned that high grade Lincolns gave us the same results as the full-bloods, providing the Karakul bucks were free from tight-wool blood. Unfortunately in our first herd, our expert whom we trusted, selected some Karakuls for us that clearly show by their short and soft underwool that they contain a tight-wool strain, which can only be overcome by breeding them to the best types of lustrous long-wools. From a mutton standpoint, nobody has made more valuable tests than Messrs. Rhome and Goodnight, proving that Karakul-Shropshires with the Karakul strain predominating, show a wonderful increase in weight and lambs at 4 and 5 months have been found to weigh from 80 to 100 pounds. The Armour Packing Company of Fort Worth, Texas, vouched for these facts and also stated that the Karakul strain seems to have the faculty of absolutely removing the disgareeable woolly and musk-like flavor peculiar to the mutton of our tight-wools.

In our former article we spoke of the great hardiness of the Karakul. For three months we were pasturing on the Mesa at Belen, Texas, 200 high grade Lincolns, purchased from F. R. Gooding, and some 30 Karakuls. Old settlers were of the opinion that Merinos would have starved on this Mesa in one and a half months, as there was practically no grass on it, and the sheep had to live off the little brush and the few weeds found there. At the end of two months we began losing Lincolns on account of starvation, and yet the Karakuls were still in good shape. There is no doubt that the Karakul sheep should be more generally introduced in the south-west where sheep have to go a long distance for water and where they cannot possibly exist unless they possess the rustling and browsing qualities of the Mexican goat. From a strictly fur standpoint, the Karakul will probably be better off in the north where feed is more plentiful, as it has been found that unless the ewes are in good shape the last two months of pregnancy, the lambs are born with insufficient luster. Of course, in the irrigated districts where alfalfa is raised this objection can easily be overcome. Breeders of mutton strictly should know that 25 per cent of Karakul blood will make a great difference in their flock in hardiness, weight and

quality of mutton. In this case the Karakul bucks do not have to possess luster and tight curls at birth.

Professor Nabours of the Kansas Agricultural College stated in a lecture recently in Topeka, that in East India, Bokhara broad-tails crossed with native coarse wool sheep produced lambs weighing 90 pounds when 4 months old! This would tend to show that Rhome did not exaggerate in his report; again Rhome's figures are admitted to be correct by the Armour Packing Company. The writer is of the opinion that half-blood Karakul-Lincoln lambs will show the same weight, and before long we will know exactly, but it is doubtful

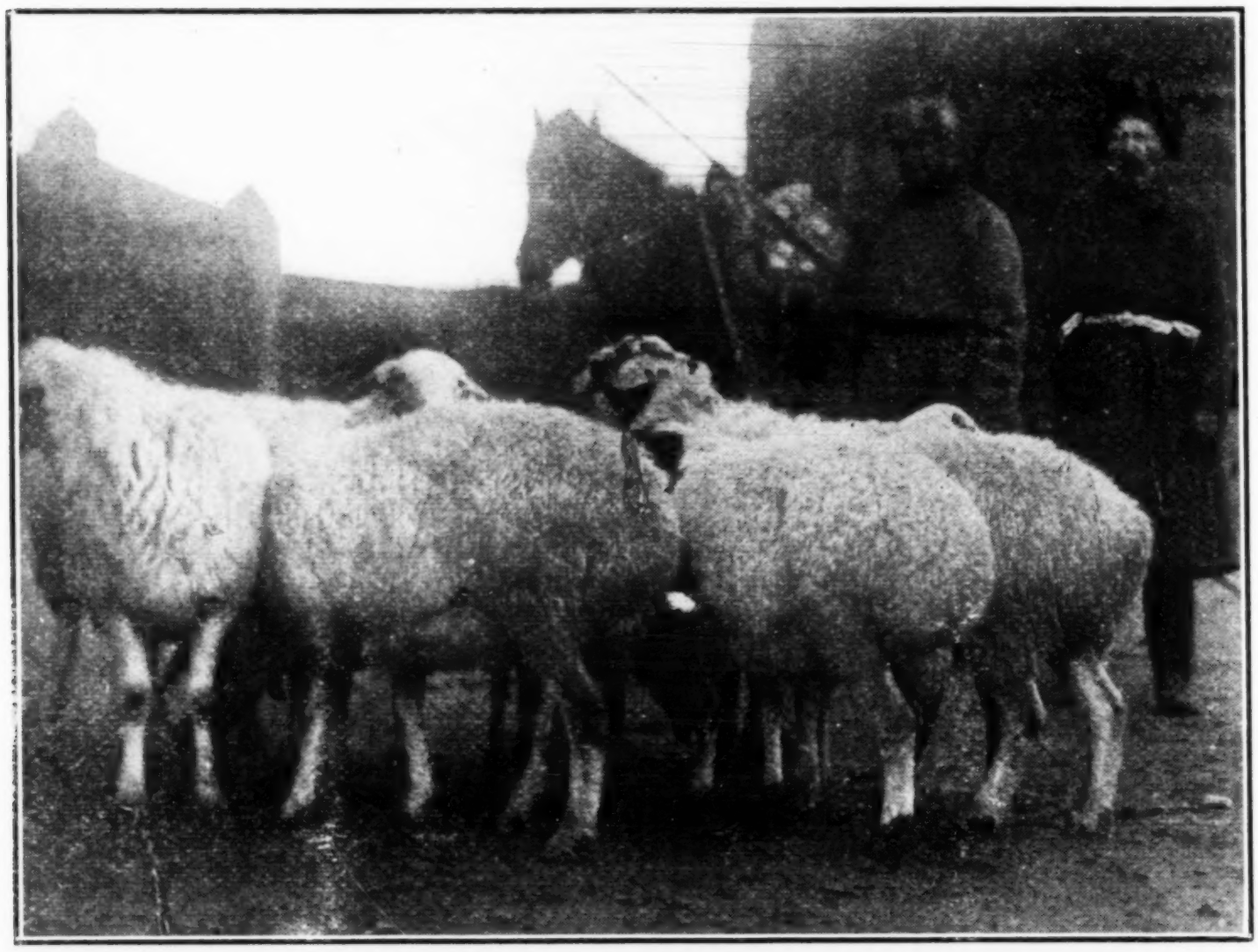


FIG. 1.—MONGOL SHEEP.

Note tail formation identical with Karakul. Is this not sufficient proof that Pallace's classification is wrong? Certainly, the Mongol sheep belongs to the Ovis platyura. By courtesy of Prince Yermoloff.

whether it is safe to cross such half-blood rams on the small Merino of the southwest and Mexico, as at birth the lambs will hardly be able to pass the pelvic opening.

OVIS STEOTOPYGA OR THE FAT-TAIL SHEEP

This breed, according to Prof. P. N. Kooleshov, bears the name of fat-tail sheep on account of the lobular accumulation of fat that is located on the buttocks and on each side of the very short tail con-

sisting of only 3 to 5 vertebrae. There are generally two symmetrical pillows on each side of the tail and these together with the short tail constitute the so-called "Koordiuk" which in the fat sheep weighs 30 pounds, but ordinarily weighs but 10 to 12 pounds. The two symmetrical fat pillows on each side of the tail are covered on top with long and stiff hair; underneath the surface is smooth and free from hair. The peculiarity of storing fat in such big quantities under the skin of the buttocks and tail is also characteristic of the broad-tail sheep known as *Ovis Platyura.* From the tail of both of these varieties one can ascertain the physical condition of these animals for the better they are fed, the larger in proportion is the "Koordiuk."

The fat-tail breeds are found in Asia, Africa and Russia. According to Robert Hartman, the fat-tail sheep originated in Arabia. Pallas asserts that the fat-tail originated directly from the Argali. Fitzinger, Wagner and Bom do not agree with Pallas. Fitzinger divides the fat-tail into the following classes: Tartar, Mongol, Daur, Burat, Khirgiz, Kalmik and Cape. A few fat-tails are found also in Egypt, Noobia and Sennar, but it is an established fact that the broad-tail sheep was in Africa several centuries before we had any record of the presence there of the fat-tail sheep. In many places the fat-tail sheep were crossed with the broad-tails in which case an animal was obtained with a much shorter tail than either, and a great many of these crosses are found in the Caucasus, and in the dry steppes of the Precaspian Province of Central Asia. According to Bom, the Madagascar, Mekka and Persian short-tail broad-tail varieties (Shirazi, Zigai, Doozboy, etc.) belong also to this class. We cannot agree with Bom, especially in regard to the Shirazi and Doozboy, the former being Karakul long-wools and the latter Karakul tight-wools. In many instances where the Karakul blood is in preponderance the tail does not differ from that of a Karakul, although in the Zigai the much shorter tail and other anatomical features would indicate an admixture of the fat-tail strain.

When in this country a Karakul is crossed with an American lustrous long-wool, we produce a magnificent fur, but our short-wools or tight-wools give us fully as inferior and matty fur as is the case with the Karakul tight-wools that Bom is attempting to connect with the fat-tail sheep. In any event neither Sinitzin nor Poniatovsky claim any such relationship. Of course, it would be very interesting to find out just what went into the formation of the Shirazi, Zigai, Doozboy, and other grade Karakuls. Roughly speaking,

FIG. 2.—[redacted] VOLOSHSKAIA BUCK.

By courtesy of Prince Yermoloff.

we only know that it is either tight-wool or long-wool blood. The fat-tail sheep are very numerous in Bessarabia, Charkov, Taurien, Crimea, Ekaterinoslav, Astrachan and the Caucasus. In the Volga district the fat-tails are known as "Ordi," also "Kirgizki-Tshoontooki;" on the other side of the river Don, as "Kalmitskaja" and in Crimea they are called Greek sheep. In the Caucasus there are three classes, the so-called Mazechi, Bozachi and Karabachi.

Of late years these various sub-classes of fat-tail sheep have been crossed with other varieties of Russian sheep, but in the Caucasus and among the Nomadic tribes of Asiatic Russia the *Ovis steotopyga* is still kept in a pure state. That this sheep can cover a large area when necessary, is proven by its long and strong feet. The neck is also very long, and its ability to digest the scantiest of feed on the Steppes and even at that accumulate in no time immense quantities of fat, marks this as a typical desert sheep. And why should it not? Is its hardiness and rustling qualities not due to the Karakul blood which it contains and to which it owes its great fat storing qualities? Is the fact that those which resemble the Karakul most, actually produce furs, not another proof? From what source did it derive its black pigment if not from the Karakul? The weight is about 150 pounds; some types are much heavier. The nose line is greatly bent and the tendons are of the strongest kind. Among both sexes are those that are horned and others that are not. Some rams have as many as 4 to 6 horns; the head is small and the ears are pendulous. The fat-tail sheep is raised principally on account of its excellent mutton and fat. The fat is used in place of butter, and is very appetizing, and devoid of the strong wooly taste characteristic of the European sheep.

The wool is of two kinds, the long hard coarse outer wool (Karakul) and the soft fine under wool. The first is lustrous at birth, the latter dull. This is precisely what happens in crossing a Karakul to any tight-wool. It makes no difference how one might try to breed the tight-wool strain out, it simply can't be done, unless a lustrous long-wool is bred to the grade Karakul at least once. After several more crosses with the pure Karakul the short soft under wool seems gradually to disappear. The color of the wool is varied. Some is auburn, whilst other is gray, black and even white. In some the under wool is very lustrous and white with occasionally a black or auburn hair (Karakul long-wool). Excellent skins are obtained from the lambs of such ewes. The fur is either black or auburn with very pronounced curls. Where could such ewes have gotten their

pigment from if not from the Karakul which is the most lustrous and highly pigmented animal known? The wool of the adult is used in the production of the best of rugs and felt.

According to Glasco the wool of the Mazech is red, brown and white, whereas the Bozach possess gray wool and the Arick is entirely white. According to Sinitzin, fat-tail sheep have been raised in Crimea for four hundred and fifty years, but today the Malitch is replacing them rapidly because they produce a far superior fur.

The best of the so-called Malitches can hardly be differentiated from the full-blood Bokhara Karakuls, and are known by everybody to be Karakul long-wools, just such as we will have in America before very long as the result of crossing Karakul rams to our Lincolns, Cotswolds and Leicester ewes. If any enthusiast of the *Ovis steotopyga* prefers to believe that the Karakul has descended from it, or that there is no relationship between the two, we have no objections. As for ourselves, after reading everything that we could find during three years on this subject and seeing a number of the animals, we have come to the conclusion that the fat-tail sheep is nothing more than a grade Karakul, a fur producer where tight-wool blood is absent, and a very hardy sheep with excellent mutton producing qualities where tight-wool blood is present. What about the great difference in the number of vertebrae composing the tail of the fat-tails and broad-tails? In time we may offer a satisfactory explanation.

THE OVIS PLATYURA OR THE BROAD-TAIL SHEEP

The principal characteristic of this class is in their long fat tail which consists of fifteen to twenty-four vertebrae. The tail is covered on the outside with the same wool as the body and often comes clear to the ground. In some classes great masses of fat surround the tail from its setting to the tip, while in others the lower portion of the tail is free from fat and therefore movable. The broad-tail sheep is found in Africa, many parts of Asia and South Russia and there are a few even in Southern Italy, and France. Prof. Robert Wallace of the Edinburgh University, informs us that the native of Cape Colony raise a broad-tail with very long feet and middle weight, the tail weighing from $6\frac{1}{2}$ to $16\frac{1}{2}$ pounds.

The broad-tails are less liable to scabies, than Merinos and other tight-wools and their wool is coarse and long. Some of them have horns, others have not (Natusius and Bom). Among the Russian broadtails there are the common Russian broad-tail, the Karakul,

FIG. 3.—MALITCH SHEEP.

Some of the ewes appearing more pigmented, contain more Karakul blood. By courtesy of Prince Yermoloff.

the Pirnaja and Voloshskaja. Most of these varieties are horned. As for the ears, some have drooping ears, others only partly so and some have ears standing straight up. Another characteristic of these sheep is that when their lambs are killed shortly after birth, an excellent fur is produced as is especially the case with the Karakuls and Malitches. These sheep are raised almost entirely on account of the great value of their lamb skins.

In the common Russian broad-tail the tail comes down clear to the ground and is immense in size. This class is found in Bessarabia, Donskaja, Olblast, Taurien Province and Ekaterinoslav. Average weight about 140 pounds. The horns generally have two spiral coils and finally greatly diverge laterally. The ears are semi-pendulous and very long. The head and feet are covered with short white hair with occasionally a black spot on these parts. This sheep has a long hard outer wool and a short but a rather coarse yellow under wool. The meat is the best known. That this class of sheep came into Russia from Central Asia, the home of the Karakul which it resembles greatly, is commonly conceded.

The Pirnaja Ovtsa.—This sheep resembles the so-called Tschoontooki very much and in its makeup is a fat-tail rather than a broad-tail sheep, but the horns are very much longer and in spiral fashion protrude greatly. The ears stand up straight and the tail is even shorter than in the Tshoontooki but with great fat accumulations on the sides of the tail. The wool is white and it is not a fur producer.

The Department of Agriculture of Russia is of the opinion that this is merely one of the several sub-classes of the Voloshskaja sheep and bears no relationship to the Tshoontooki. The wool is sometimes black (no doubt due to a larger per cent of the black Karakul pigment) and there are in Hungary the so-called black and gray, "Zackelschafe" or "Voloschskaja," that must have still more Karakul blood in them and like the Malitsch, give excellent fur and closely resemble the Karakul. We understand that recently a small herd of them were presented by the Emperor of Austria to the Argentine Republic.

The Voloshakaja or Zackelschaf.—This broad-tail class is found in Russia, Roumania, Austro-Hungary, and on the island of Crete. At a distance some look like Angora goats with immense horns. Most horns do not coil as is the case in the preceding class, but diverge laterally and in some cases upward. The ears stand straight up, although some are semi-drooping. Few have no horns. The tail which is triangular, resembling a sugar beet, is larger than in the

common Russian broad-tail and manipular coupling is therefore necessitated. The outer wool is white, seldom gray and black, very long and coarse. The under wool is very fine, lustrous and in great demand all over Europe by manufacturers of fine wool rugs. This breed of broad-tail resembles the Voloshskaja sheep very much, and is renowned for its most excellent meat. The Malitches are raised exclusively in the Province of Taurien, and in Crimea. At the setting of the large tail, consisting of twenty vertebrae, there are found great quantities of fat. The hair is black, gray or white. The skins of very young lambs give excellent fur and resemble our half-blood American-Lincolns very much. In Crimea these sheep have been bred for four hundred and fifty years and closely resemble the Karakul or Arabi of Bokhara; especially in the formation of the rather triangular tail. The ears are half drooping. The bones of the forehead are very protruding and the nose line is curving. The horns are not unlike those of the common Russian broad-tail. The wool is very long and coarse and either black or gray. In fact, they change their color precisely as the Karakuls do, that is to say, when born the lambs are jet black, and velvety in appearance; after three to four months the hair becomes brownish and when one year old becomes decidedly gray. Some lambs are gray when born, and produce beautiful fur resembling black silver fox, but not many of this class are raised.

From April 1 to September 1, the ewes are milked and give about 70 quarts of exceedingly rich milk, and from which the "Brinza" cheese is made. In weight they compare favorably with our Shropshires. The meat of the very young lambs brings from 30 to 50 cents per pound and is regarded as a great delicacy. In that country it is broiled barbecue fashion (Shashlik) and seasoned with parsley and green onions, salt, pepper, the slightest trace of garlic and a powder made from a plant native in Afghanistan and resembling powdered grape leaves. It makes a most appetizing dish.

To the broad-tail class belong a number of breeds in the Caucasus, but what little literature there is found on these breeds is in Asiatic languages. The most important breeds are the "Tartarskaja-Tooshinskaja," "Groozinskaja" and "Osetinskaja." They vary greatly in weight and in the size of tail. The Caucasus breeds have very long and lustrous wool and most beautiful pelts. According to DeBitam, some have smooth, others very curly wool. K. D. Dunavsky states that the Tartarskaja-Tooshinskaja sheep resembles greatly the Groozinskaja. The Tooshinskaja has white wool, except on

the head, ears and feet which are covered with yellowish spots. The head is small, hook-nosed; the horns long and spirally bent. The females have no horns. The body is short, but broad. The tail consists of sixteen vertebrae. The average weight is 140 pounds. The wool is fine, long and very lustrous. The meat is very white and excellent and the fat of the tail is used in place of butter and in Tiflis brings practically the same price. The best of them are raised in Cachetinia. When crossed with Oxfordshires a very good meat is obtained.

Of great importance to the breeders of lamb skins are the so-called Sokolskaja, Resheteliovskaja and Bessarabskaja-Tshooshka. These varieties are unquestionably grade Karakuls and as there is no tight-wool blood present, they give us excellent skins. They are classified as belonging to the Long-tails or *Ovis dolichura*. We know that in all quarter breds there is practically no change in the tail and as the non-Karakul strain in these varieties possess a long tail, these fur producing varieties cannot be classified with any other type except the Long-tail Thin-tail. There are four varieties of fur produced from these sheep, all of which have good luster and are black, but they vary greatly in the formation of the curls, those with larger curls resembling our half-blood Karakul-Lincoln pelts greatly, but are much inferior in quality.

The Persian Broad-tail.—There are a great many varieties of broad-tails in Persia, most important being the Arabi, Shirazi, Doozboy and Zigai. A party in California brought some Shirazis to this country and crossed them with Shropshires and called them Persian broad-tails. The Shropshire blood made them Karakul or Arabi tight-wools. They are therefore not fur producers, but are excellent mutton sheep, possessing great hardiness, good weight and their mutton is free to a large degree from the woolly flavor of our tight-wools. All this is due of course to the Karakul blood, which gives them a partial broad-tail effect. A half-blood Karakul-Lincoln is more desirable as it will have still more weight, just as much hardiness, better mutton and the best of fur, if crossed with lustrous long-wools. Breeders should not be misled, as Persian broad-tails *do not produce the so-called Persian lamb pelts*, which are beautiful half- and three-quarter-blood Karakul long-wool lamb skins tanned and dyed. Some breeders confound the Persian broad-tails of the United States with Persirianos which is an injustice to the Persian broad-tails, as the Persirianos, produced by crossing Persian broad-tails with Merinos, contain only half as much Karakul blood and

should not be used for breeding purposes if Persian broad-tails can be secured, as the Karakul blood is too dilute to do that name justice.

The Karakul Breeds.—The Karakul breeds are found in Arabia, Palestine, Syria Mesopotamia, Asia Minor, Persia, Afghanistan, Chiva and especially Bokhara, which is the home of the Arabi from which all other Karakul breeds descend. Today the Khanate of Bokhara with its immense oasis is the one place where the pure Arabi has been preserved, although a few are said to be found also in north-

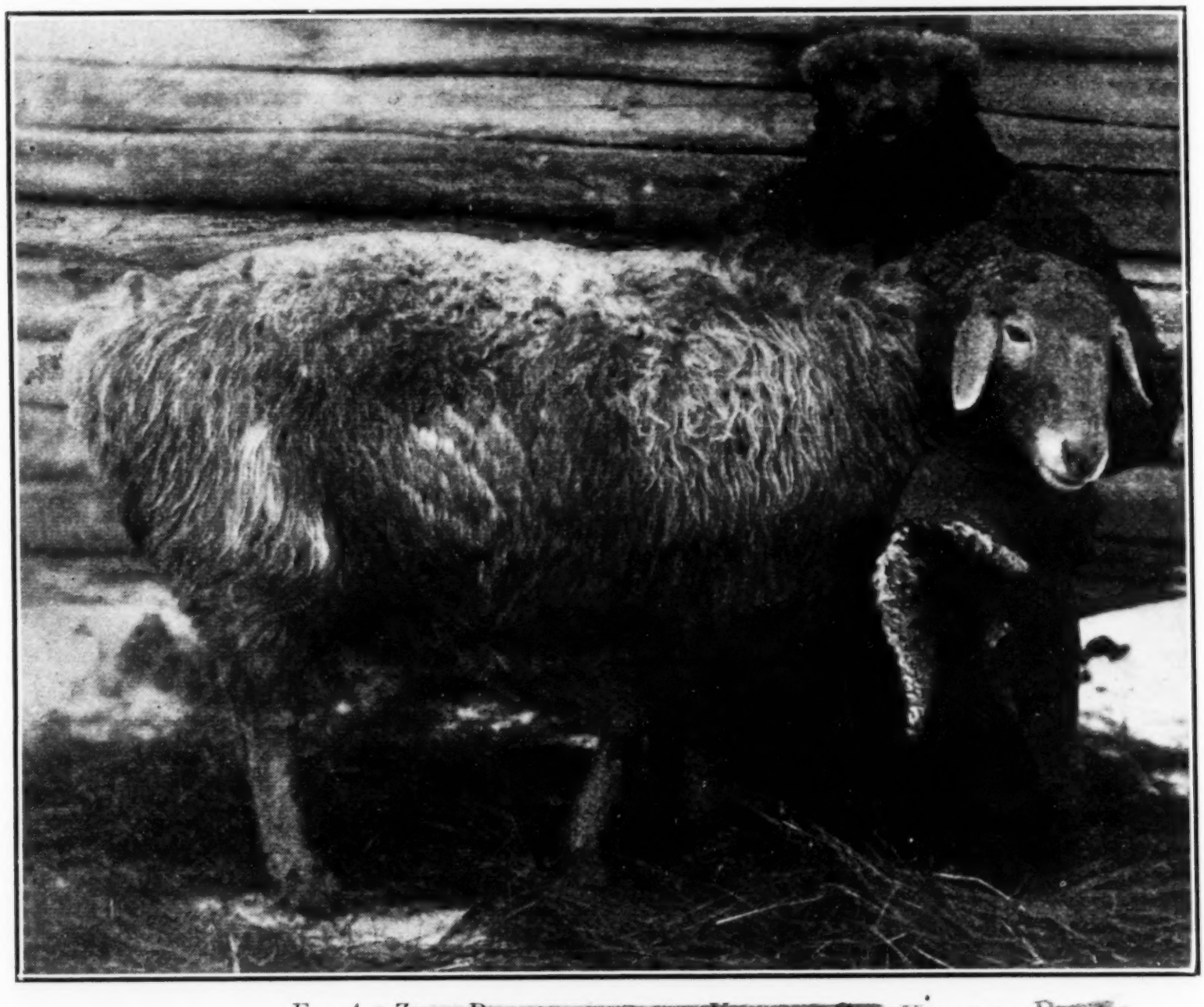


FIG. 4.—ZIGAI BELONGING TO THE KARAKUL CLASS. KHIRGIZ BUCK.

This specimen apparently has less light wool in him than is generally the case, and is therefore a fur producer. By courtesy of Prince Yermoloff.

eastern Persia and Chiva. According to Poniatovsky of Bokhara and Sinitzin of Crimea, the name Karakul is applied not only to the Arabi, but to all grade Arabi most important of which are the Shiraz, Doozboy and Zigai.

The Shirazi is an Arabi Long-wool and like the Malitch an excellent fur producer, whilst the Doozboy is an Arabi tight-wool which has been crossed with certain varieties of the *Ovis steotopyga* (fat-tail) giving us the Zigai. Unfortunately what little literature there is on

the last three classes, is in Afghan, Persian and Tartar, and until the Russian Commission gets out its book on fat-tail and broad-tail sheep, we can say nothing more.

According to certain authors the small Arabi came to Bokhara from Arabia and hence the name Arabi or Arap. This is doubtful,

FIG. 5.—FULL BLOOD KARAKUL EWE, 1½ YEARS OLD AND LAMB.

This ewe contains no trace of Afghan blood; nevertheless, lamb came with beautiful curls and luster. By courtesy of Joseph Simonson. Exhibited in Omaha at the National Wool Growers Association, December 14, 15, 17, 1911.

but it must be added that Sinitzin thinks it possible, being of the opinion that the Arabi originated in a hot country which explains its tight curls. He also believes that curls will only form in hot countries, in men as well as animals, and cites as an example the

negro. The Uzbecks on the other hand claim that the Arabi which they compare with the waves of a black lake (Kara-Kul, pronounced Kool) came into the desert of Bokhara from the Pamyrs and that it is a mountain sheep and that is the reason why it can endure the cold as easily as it does. We agree with the Uzbecks for the ease with which an Arabi climbs mountains is remarkable. Any sheep accustomed to a warm climate when containing but 25 per cent of Arabi

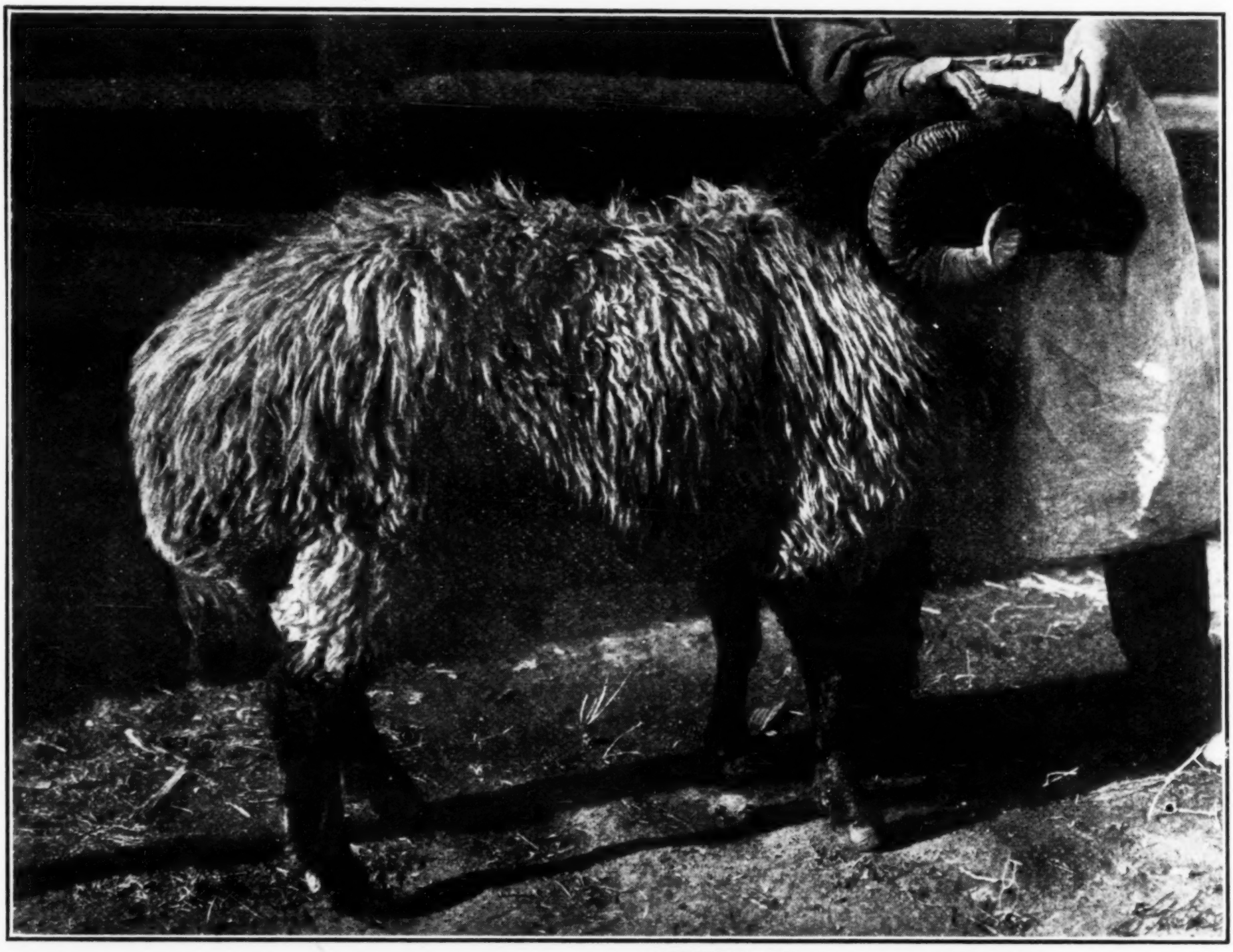


FIG. 6.—BAKOUR BUCK. KARAKUL BUCK.

Showing evidence of containing Arabi blood. By courtesy of Prince Yermoloff.

blood, becomes at once a cold country sheep; nowhere is that fact more appreciated than in Northern Asia. Burch found that a quarter-bred Arabi-Merino could stand the coldest of weather and blizzards in Michigan, and whilst Simonson reports a great loss of Shropshires near Dalhart, Texas, last winter on account of the awful snow storms, not one single Arabi succumbed. On the other hand, we can say that six months during the hottest part of the summer

in Coahuila, Mexico, did not seem to in the least affect our herd. An experience of three years has shown us that the sheep can stand extremely hot weather and very cold weather as well. If the Arabi came originally from Arabia, should we not find something in that country that would serve as a proof? Yet, we need not expect any information from that source; it is not to be had.

The natives point in the direction of Lhassa and Thibet, and the Llama-Deli could probably enlighten us. Recently we had the pleas-

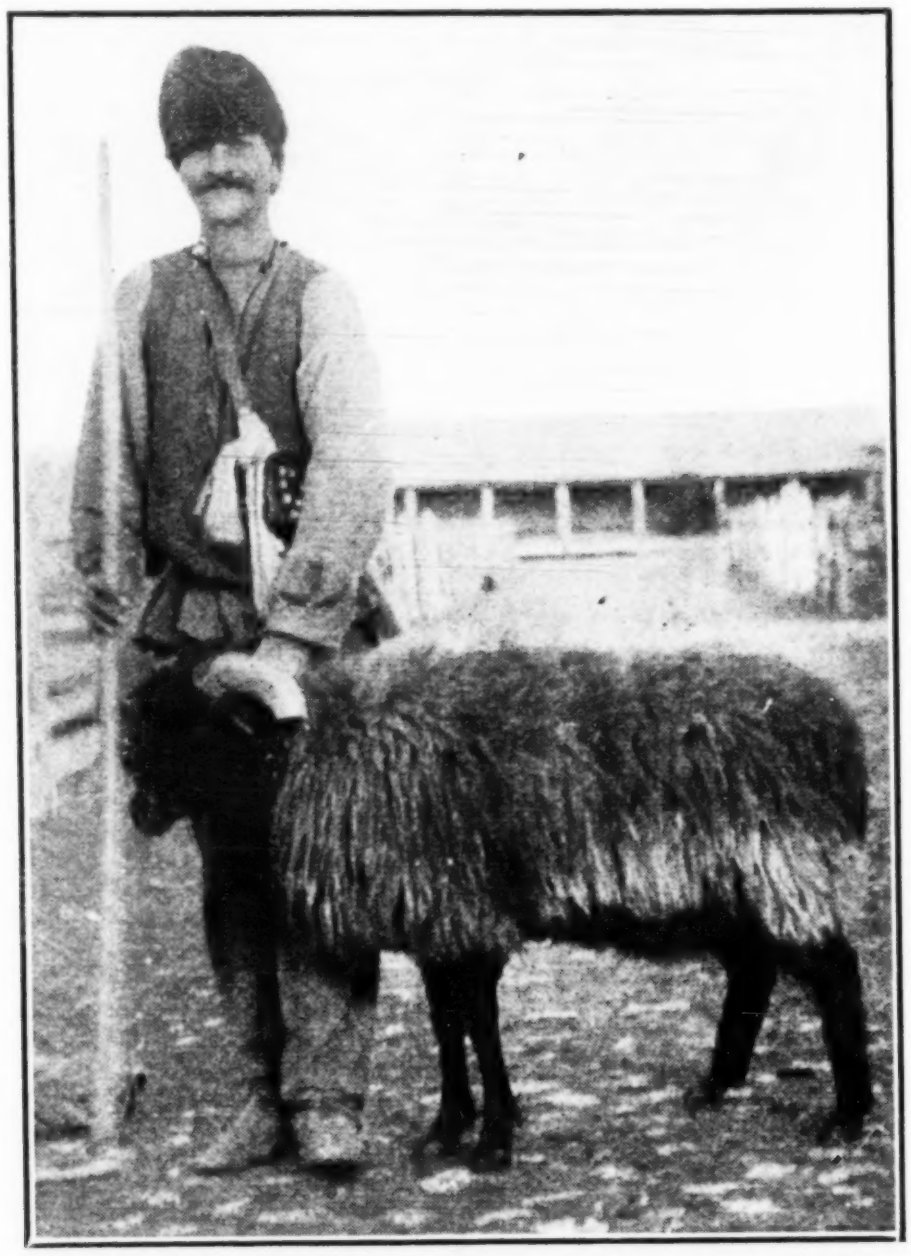


FIG. 7.—KARAKUL BUCK. ZIGAI BUCK.
Of the small *Arabi type*. By courtesy of Prince Yermoloff.

ure of talking to Lord Rochester who was one of the members of the English military expedition that fought its way into the Forbidden City. To my surprise he gave me the exact description of Sinitzin's small Arabi and spoke of the wonderful beauty of the lamb skins. Efforts were made to get a few head out, but they all died from improper care and lack of food whilst crossing the high mountains. The small Arabi which is extremely hard to find, and when found hard to purchase from the natives of Bokhara, has a narrow head,

elongated face, and slightly curving nose line, short ears, thin feet, tail triangular and not as large as that of the large Arabi; weight 130 pounds. On the head, tail and feet, which are covered with jet black, stiff, very lustrous hair, are found white spots, which may also be noted on the sides. The wool is long, coarse and gray in the adult, but jet black and in very tight beautiful curls the first few

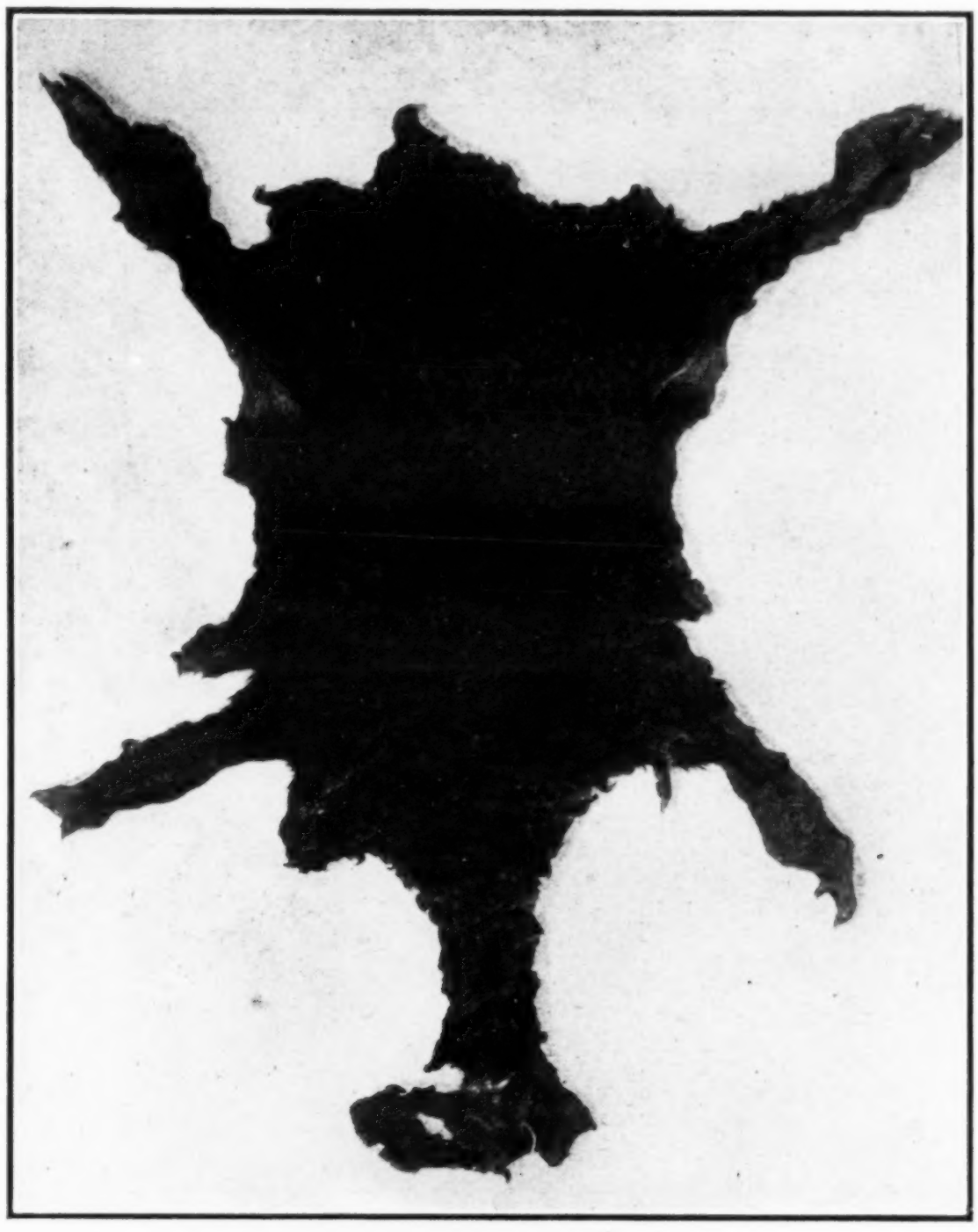


FIG. 8—HALFBLOOD KARAKULE-PERSIAN BROADTAIL.

n every way equal to a halfblood Karakule-Lincoln priced by New York wholesale furriers and dyers at $9.00. If sold to retail furriers or tailors it is easily worth $15.00 and would have been still more valuable had the Persian Broadtail ewe not contained a strain of Shropshire blood.

days after birth. According to Sinitzin this is the type from which all others originate, and they are found *only* in Bokhara, between the river of Amu-Daria and the city of Bokhara. There is no fur on earth that can compare with that of the small Arabi, when obtained shortly after birth, and there is none on the market. Any one lucky enough to own them, would not be apt to kill them for fur.

The Large Arabi.—This class, Sinitzin states, resulted from a cross between the small Arabi and some fat-tail variety. If that is true then such a fat-tail must have been cinnamon brown, as occasionally a lamb comes of that color, instead of black. But even so, why should the large Arabi have such an immense lyre-formed tail, with an S-shaped appendage on the end? In our opinion this sheep was

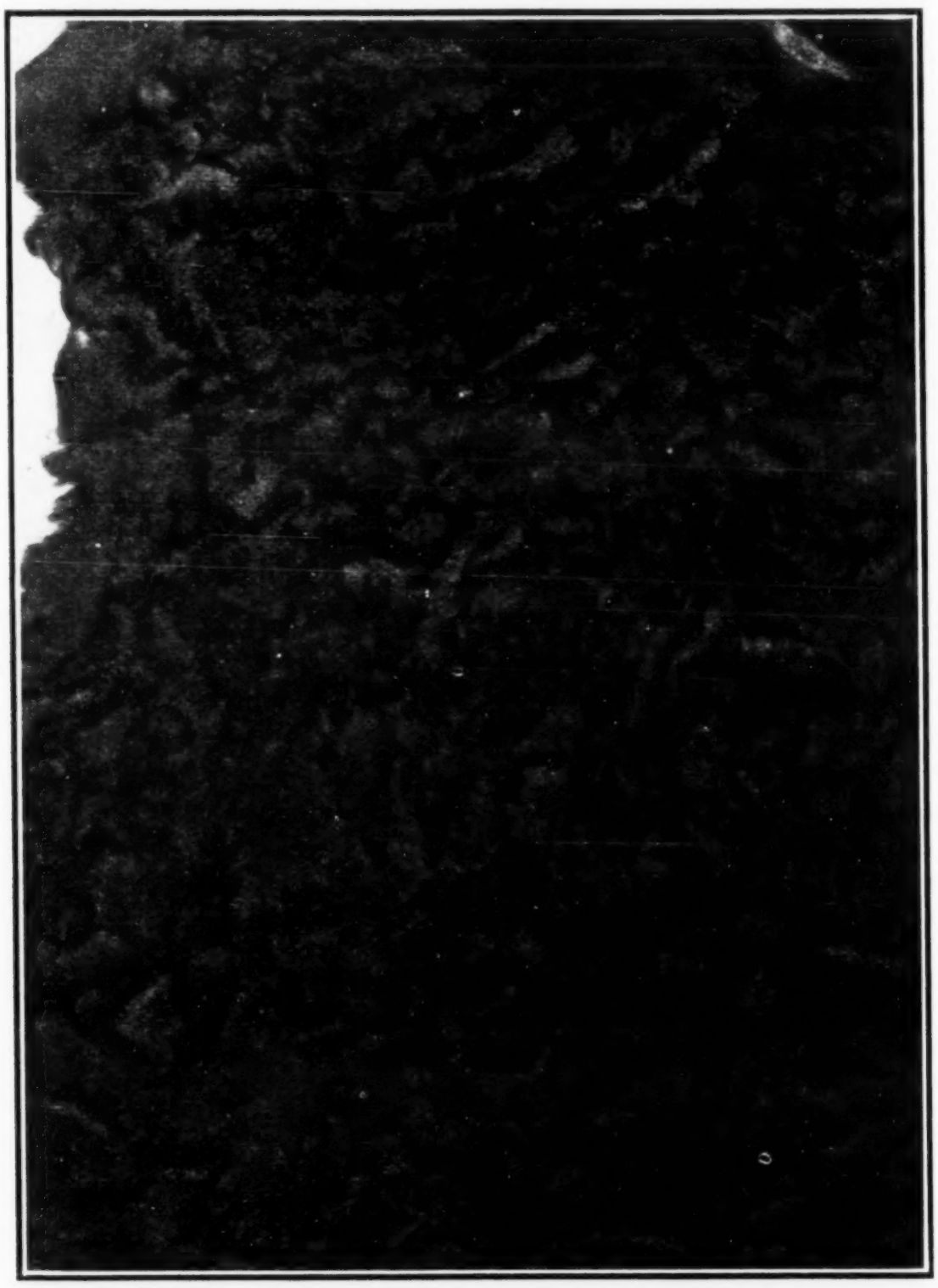


FIG. 9—HALFBLOOD KARAKULE-PERSIAN BROADTAIL.
A portion of the fur in preceding illustration slightly enlarged to show the curl.

produced by crossing the Shirazi with the small Arabi. We have observed that where the so-called brown Persian broad-tail (Shirazi) was crossed with one of our bucks (answering closely Sinitzin's description of the small Arabi) an offspring was obtained in every way closely resembling the large Arabi. In all cases magnificent skins were obtained and this is something that should interest those

owners of Persian broad-tails, that have Shirazis that are comparatively free from tight-wool blood. The fact that they are brown in color makes no difference, the offspring will nevertheless be black.

The large Arabi has a very massive head, short face, nose line greatly curving, forming a convexity, the ears are drooping and larger than in the small Arabi, sometimes the ears are absent; feet are very strong, especially hind legs. The wool is coarse, hard and long, and black at birth; in three or four months it turns brown and in half a year gray, dark gray, seldom white and occasionally remains dark brown. We do not think this sheep excels the Lincoln in weight, but it is infinitely hardier, possessing the browsing qualities of the Mexican Goat. There are quite a few of these, and one other type is to be found resulting from crossing the small with the large Arabi; they are also quite plentiful, some containing a slight Afghan strain (on the tight-wool order).

The Small Arabi.—It is very difficult to find the small Arabi and it takes a great deal of study to learn how to differentiate them from the intermediate class. One can spend thousands of dollars and cross the entire desert and return without having secured a single small Arabi. Among our herd originally containing fifteen head we find all three classes of Arabi represented, and we called them the Karakul herd although properly the name Arabi should be used.

During 1911 and up to very recently His Excellency Prince A. Yermoloff, for twelve years Russian Minister of Agriculture, now life Senator and Member of His Majesty's Council, has been kind enough to gather certain data for the writer and it is due to his efforts that we own today a very exhaustive report on Russian and Asiatic sheep, issued by the Russian Department of Agriculture at St. Petersburg. His Excellency, the Prince, also sent us Sinitzin's, Perepelkin's and Kooleshov's books, also a number of photographs for all of which courtesies we hereby express our gratitude.

TRANSMISSION OF COLOR AND COLOR MARKINGS IN HEREFORD-SHORTHORN CROSSES[a]

P. E. Fogle
Beaver Creek, North Carolina

The breeder, whether of plants or of animals, needs all the information obtainable to assist in the creation of new strains and the improvement of the known strains, and especially is it needful for the animal breeder to have all possible knowledge as his work is slow at best.

The color factor is not a vital one at this time and perhaps never will be, though even now certain colors are preferred and others disliked by the buyer, and at some future time this preference and dislike may become more pronounced.

I have done nothing new in collecting these records, but have simply tabulated the results as they have appeared. Very little seems to be known regarding the transmission of the color and color markings in animals. I have not attempted a comprehensive classification of colors of hair, but have grouped the colors with which I was immediately dealing in these experiments, under five general groups as follows: Red, roan, spotted, white, red body with white face. The animals coming under the first four groups are pure or grade Shorthorns, the fifth the progeny of Hereford bull with Shorthorn cows.

From 26 solid red or nearly solid red cows there came 35 calves of which all had red bodies and white faces:

16 had red circles around eyes and spot on nose;
7 had red circles around eyes but no spot on nose;
2 had imperfect eye circles;
10 had no red on face.

From 7 roan cows there were 9 calves:

5 had roan bodies and white faces;
1 had red body and white face with no eye circles but spot on nose;
3 had red bodies, white faces with circles around eyes and spot on nose.

From 8 spotted cows there came 12 calves:

1 had red body and white face with eye circles around one eye only;
1 had red body and white face with imperfect eye circles;

[a] Progress report from Committee on Animal Hybrids. Prof. W. J. Spillman, Chairman.

7 had red bodies and white faces with circles around eyes and spot on nose;
2 had red bodies and white faces with no red on face, and
1 had roan body and white face.

From 2 white cows there were 6 calves:

All had roan bodies and white faces;
1 had imperfect eye circles and spot on the nose.

From 1 cow with red body and white face with circles around eyes and spot on nose there came:

2 calves with red body and white face with no red on face.

From 3 cows with red bodies and white faces with red circles around eyes there came:

3 calves with red bodies and white faces with no red on face.

From 3 cows with red bodies and white faces having no red on the face there came:

3 calves with red bodies and white faces with no red on face.

From 3 cows with roan bodies and white faces there came 4 calves.

1 with red body and white face.
3 with roan bodies and white faces;

Placing the offspring of each of the different cows in separate groups for comparison there is one spotted cow that had 4 calves with red bodies and white faces, 2 of these calves had eye circles and spot on nose; 1 had imperfect eye circles and 1 calf had no red on face. Another spotted cow had two calves: 1 with red body, white face and circles around one eye. One with roan body and white face with no red on face. One cow white in color had 2 calves both of which had roan bodies and white faces, but 1 had imperfect eye circles and spot on nose. One red cow had 4 calves, all of which had red bodies, white faces and circles around eyes. Another red cow had 3 calves all of which had red bodies, white faces, eye circles and large spot on nose.

One roan cow had 2 calves both of which had roan bodies and white faces. Another roan cow had 2 calves, 1 of which had roan body and white face.

Without detailing each case, where a cow had more than 1 calf it may be stated, that in every instance where a red cow had more than 1 calf, those calves were all marked alike, with two exceptions; namely: A Jersey cow that had 2 calves, 1 with red body, white face and eye circles, the other with red body, white face and no red

markings on face. A brown cow that had 3 calves, 1 with red body, white face, eye circles and no spot on nose, 1 with red body, white face, eye circles and no spot on nose, 1 with red body, white face with no red markings on face.

Classifying the 50 calves which entered into those observations according to color and markings we have:

33 or two-thirds had circles around eyes;
27 or practically one-half had spot on nose, of these only 1 had spot on nose without eye circle;
7 had eye circles without spot on nose;
1 had circle around one eye only;
2 had imperfect eye circles;
12 had no red on face.

The proportions of two-thirds and one-half in relation to eye circle and spot on nose, as given above, seems to be fixed since it has held true in all my tabulations, even when there were only a few calves to record.

Summing up color markings of the roan calves we have out of a total of 16 calves with roan bodies; 16 calves with white faces; 1 with imperfect eye circles and 15 without eye circles or red markings on faces.

A few facts in transmission of color and markings have evidently stood the test of time and until revised by future knowledge will be of assistance to the breeder. Thus the circle around eyes would seem to go with the solid red color, as the greater number of red calves carry the characteristic eye circle. The fact that out of 16 roan calves 15 have no red markings on face (having only imperfect eye circles) strongly points to the dissociation of eye circles with roan color. The cross of red and white result in roan, and the roan cow, having received red from one parent and white from the other, transmits the red to about half her offspring and roan to the other half, so that about half the calves from a roan cow bred to a Hereford bull will be red and the other half roan.

All cattle breeders who have handled grade Herefords will understand what is meant by the eye circle and spot on nose. To those not familiar with such cattle, I would explain, that when a red cow is bred to a white face (Hereford) bull many of the offspring have a red circle around each eye and a red spot on the nose, this spot varying in size from 2 inches in diameter to nearly covering the face.

It is of interest to note that this eye circle and spot disappear in the offspring when a cow thus marked is bred back to a Hereford

bull. In other words, a three-fourths grade Hereford does not as a rule show this characteristic mark. I am not prepared to say this spot will be always removed in the first generation; it takes several more crosses to permanently remove it, but from 10 cows bred having white faces (4 with eye circles and 1 with spot on nose) not a calf shows a sign of these marks. The keeping of records of the transmission of color and color markings will be continued and further reports, comprising larger numbers of cattle and extending over several generations, will be made to the Association. It is as yet too early to attempt to draw definite conclusions, but from the results given above, the writer feels encouraged to continue, as the road to definite knowledge is now cleared.

THE TURKEY AS AN EGG PRODUCER[a]

W. N. IRWIN

Washington, D. C.

From the settlement of our country until the present time the turkey is the only native[b] that has been brought under domestication. In our economic system the turkey has been used almost exclusively as a bird for our table on Thanksgiving Day and other holiday occasions. It has for this purpose earned a justly popular place in the minds of our people.

According to the U. S. Census Report we had on June 1, 1900, 6,599,367 turkeys in the United States. These were undoubtedly breeding stock, since there is no record of their being kept anywhere for the sole purpose of producing eggs for the table, as is the case with chickens and ducks.

In forty years' experience on farms in Ohio and Kansas, where we were never without a small flock, the writer never knew or even heard of turkeys laying more than one or two settings, and that always in the early spring. I was ignorant of the *fact* that in some parts of our great country there were *some* turkeys that continued to lay more or less throughout the season from the latter part of March to January.

After living in Washington a few years I began the study of fruit varieties grown in the vicinity by walking through the market lines Tuesdays, Thursdays, and Saturdays, where the farmers within a radius

[a] Mr. Irwin prepared this paper shortly before his death, which occurred June 24, 1911.

[b] Both ducks and geese, have at different times and in limited numbers been domesticated, but are now so mixed up with Asiatic and European species that it is very doubtful if there is a single variety of purely American origin.

of twenty-five miles bring every conceivable product of the farm and woods. Early in July, about 1900, I saw some turkey eggs, but scarcely glanced at them, thinking some one had found an abandoned spring nest and that they would not be in condition for the table. On another trip through the market I saw turkey eggs on two or three different stands. Having tasted of turkey eggs in my boyhood days, and remembering their delicious quality, I purchased some, and after enjoying eating them, began a systematic search for all I could find. From March to June, inclusive, the eggs are worth $1.50 to $2.50 per dozen for hatching purposes. From July to January, inclusive, they are sold at about 5 cents per dozen above the price for chicken eggs. For about ten years my family, as well as many of our friends whom I have supplied, have been enjoying this truly native American luxury. In no single year since I began have I purchased less than twenty-five dozen eggs, while one year, 1903, from June 27 to December 31, I was able to secure 130–2/3 dozen, for which I paid $42.57. In 1902, between July 15 and December 18, 53–2/3 dozen were purchased for $18.34. These eggs were bought from farmers whom I found to be honest and truthful, one-half dozen to a dozen per week, running along through the season. These farmers are holding today many of the same customers they had when I began with them. One farmer, Mr. Benj. Groves, informed me of a hen that began laying the latter part of March and continued almost continuously until the latter part of November. He was sure she had laid 200 eggs. Having bought his eggs every week, I had no cause for doubting his estimate. Other men have told me of birds having laid as many as 150 eggs during the season.

This trait of the turkey here has been going on for so long a time that people think it quite commonplace to see the eggs in the market here. Many of my friends are buying and using them in preference to chicken eggs.

Turkey eggs, which usually sell at 5 cents per dozen above the price of chicken eggs, are more economical than any other, since they average about $2\frac{1}{2}$ pounds per dozen against $1\frac{1}{2}$ pounds for chicken eggs and seven-eighths of a pound for guinea eggs, which sell about 5 cents less per dozen than chicken eggs.[c]

[c]COMPARATIVE WEIGHTS OF EGGS PER DOZEN.

	ounces
Plymouth Rock	26
White Wyandotte	27
Guinea	13
Turkey	42
Pekin Duck	36
Chinese Goose	64

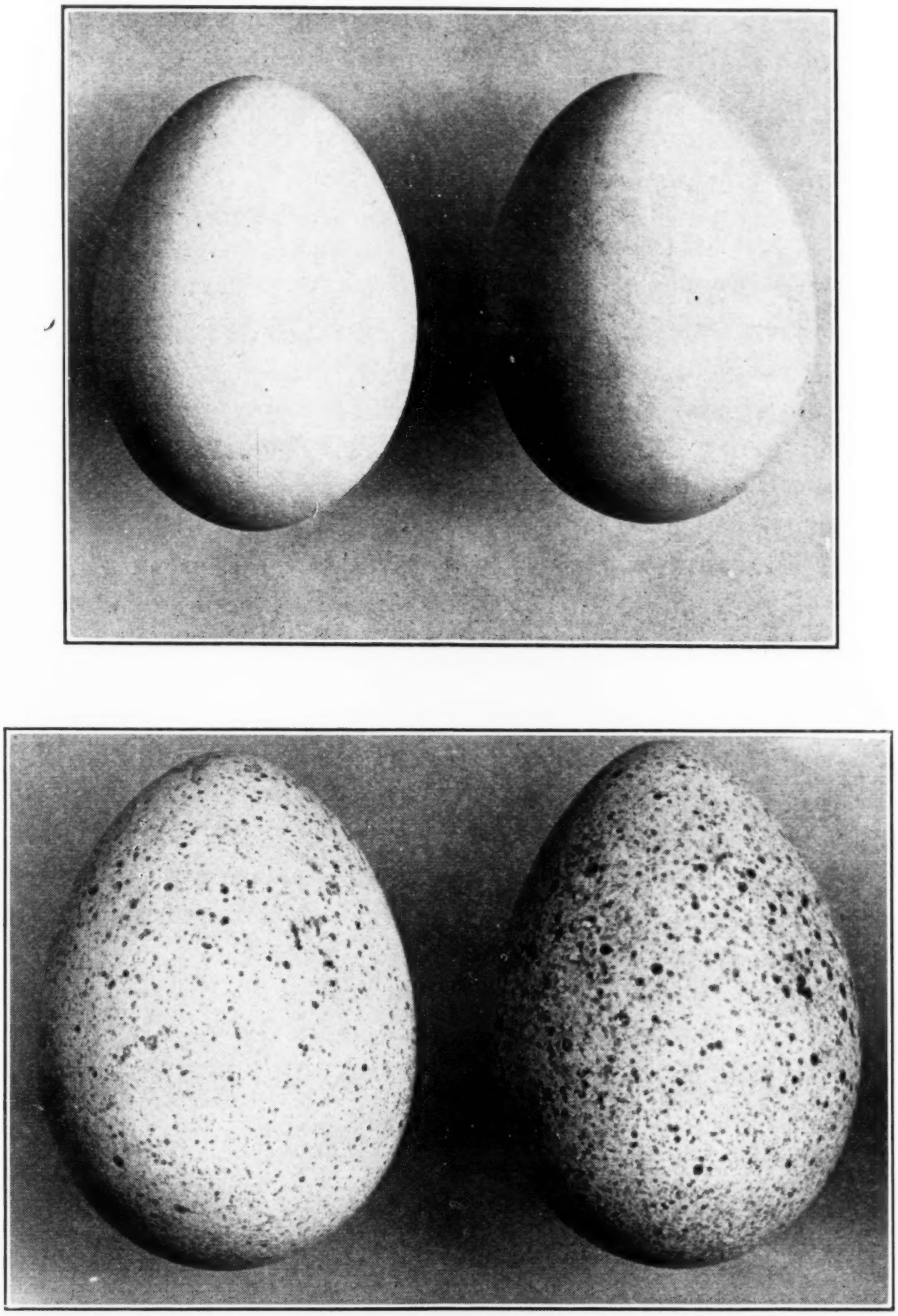


FIG. 1.—COMPARISON OF EGGS AS TO SIZE.

Two White Leghorn eggs laid second week in February, 1911, weight 8½ ounces. Two Turkey eggs laid in October, 1910, weight 13½ ounces. Slightly reduced. Photographed by E. L. Crandall.

On account of the thicker shell and membranes surrounding the contents they retain their good quality very much longer than chicken eggs, which have thin shells and membranes.

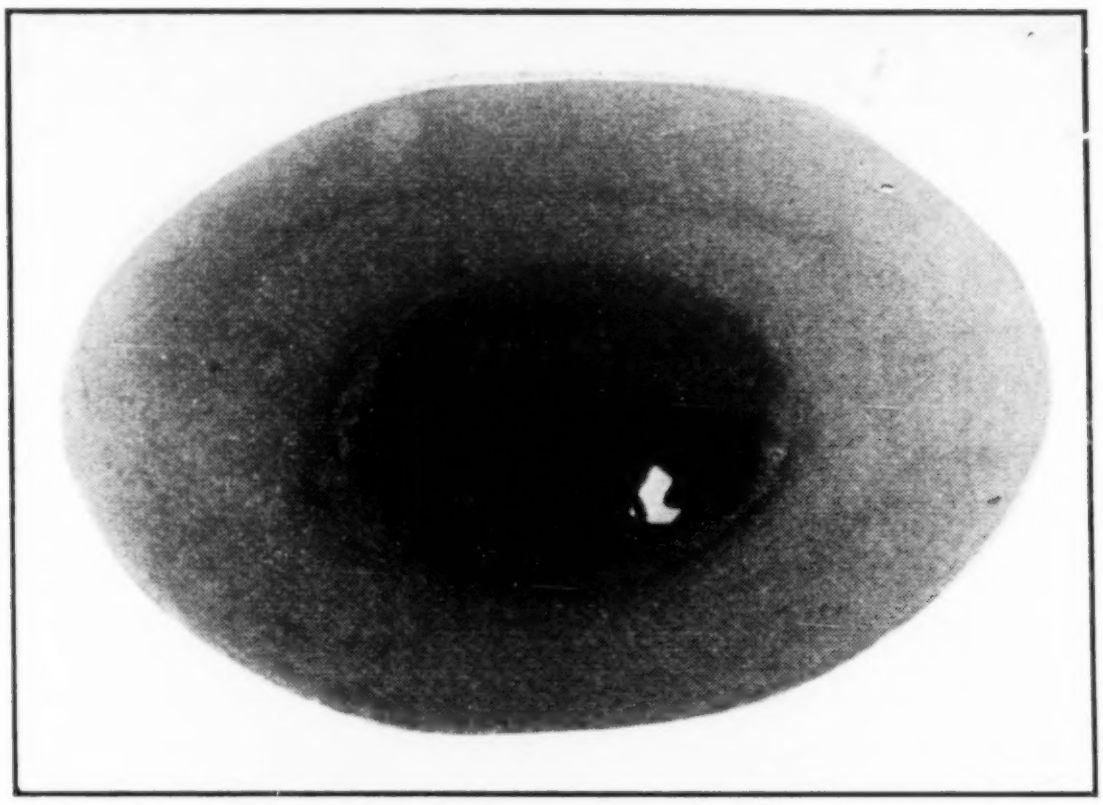


FIG. 2.—YOLK OR VITELLUS OF WHITE LEGHORN EGGS.
Natural size. Photographed by E. L. Crandall.

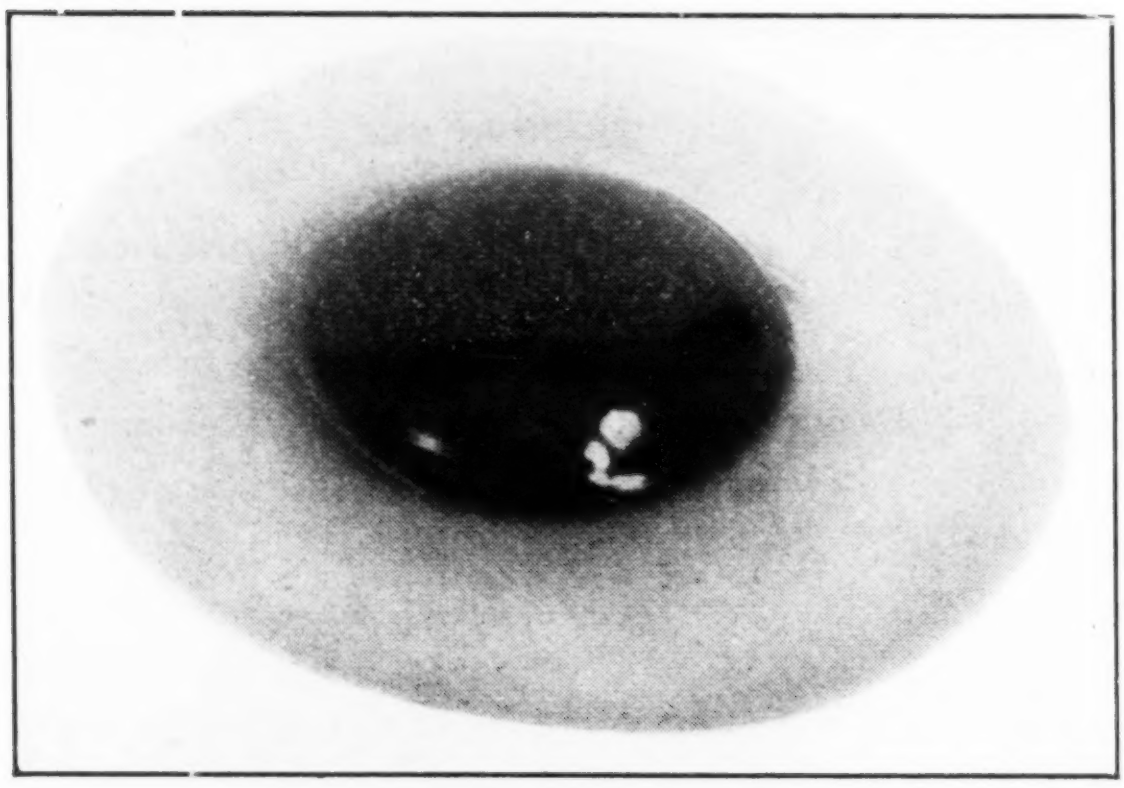


FIG. 3.—YOLK OR VITELLUS OF TURKEY EGG.
Natural size. Photographed by E. L. Crandall.

We have kept eggs purchased in September and October until March when, on opening, the yolks would drop out round and plump, and the white or albumen be perfectly normal.

In Allegan County, Michigan, and in one locality in Massachusetts turkeys are reported to me by thoroughly reliable parties as laying quite regularly throughout the season, in the latter case continuing into January.

If we can in a few decades breed up the turkeys to 100 eggs per bird, which I believe is possible by proper selection from known good layers, our six million turkeys would produce approximately 450,000,000 more eggs than we now are getting from them. At 3 cents per egg this would add $13,500,000 to our annual wealth, besides materially strengthening our national supply of better foods.

The effort will not, or need not, cost much, so that in case of failure we are no worse off than when we began.

Turkey chicks, 2 to 3 pounds in weight and certain to be from late laying birds, are on the market here throughout the winter at eating prices; $1 to $2 each ought to buy the best of these baby birds, crated for shipment, where 3 or 4 are found at one time.

There are only a few female turkeys in this locality that lay eggs out of the usual season; but from the fact that one of my friends reports a similar case in Michigan and another in Massachusetts, it would seem that there is a possibility or even a probability that there are a few of these good layers scattered possibly all over the country.

That this proposition will be ridiculed by wise men, laughed at by fools, discussed by intelligent people, and finally adopted and a new and profitable enterprise added to our poultry industry, I have not the slightest doubt. Every proposition for the betterment of man's condition on the earth, from the time Christopher Columbus started out to discover the New World to the present time, has received like treatment. When Marcus Whitman in the winter of 1842–3 rode on horseback from Oregon to St. Louis and thence by boat and stage proceeded to Washington to protest against Great Britain securing control of our Pacific Coast country, that great and wise statesman, Daniel Webster, to whom as Secretary of State Mr. Whitman appealed, took from his pocket a copper cent and flipping it on his fingers said: "Whitman, I would not give that for all beyond the Rocky Mountains; we could never defend it, nor get across the mountains to it." If Mr. Webster could return and view the millions of happy and prosperous people enjoying a contented life in that salubrious climate, and could know how helpful that country was to the east in shipping its 50,000 to 75,000 cars of fruit a year, he would, I think, admit that his conception of the value of that country had been very poor indeed.

THE EVOLUTION OF A TYPE OF HORSE

W. S. Anderson
Winchester, Kentucky

The early settlers of America imported from Europe their general purpose horse. Later, when a horse was needed by the sportsman, the thoroughbred was brought over the Atlantic. Later still, the demand arose for a heavy draft horse and he, too, had to come across the water. But there has since been developed, mostly from thoroughbred blood, a horse peculiar to this country, known as the American Trotter. The families of this standard bred horse are so diverse that it cannot yet be called a distinct breed.

Near the beginning of the nineteenth century there had sprung up, as by chance, in the state of Vermont, a breed of horses called the Morgan Horse. This breed all trace to a horse of unknown ancestry whose name was Justin Morgan. He was taken from Massachusetts to Randolph, Vermont, when a two-year-old colt. Farm mares were taken to his service, and by inbreeding his get, a very compactly built, serviceable and beautiful type of horse was produced. It is a very great misfortune, to the horsebreeding industry of our country, that this very superior type of horse should have been, by out crossing, almost lost as a pure breed.

Something over fifty years ago, there were developed the first saddle and show horses. These were produced by mingling the blood of the thoroughbred and that of the common farm horse. Owing to the great varieties of blood lines there has been no stability in the families of these saddle horses. By fortuitous combinations an occasional animal of real greatness was bred. As the production of such a horse had been largely accidental, so matings were made with him in a like haphazard way. The industry of producing saddle horses is even now in much the same chaotic condition. The owner of Harrison Chief used to say that one show horse was all a man could reasonably hope to produce in a life time.

It is easy now for the student, acquainted with the Mendelian laws of hybrid behavior, to see why these early breeders so often failed. They had too many undesirable traits in the germ plasm of their best horses. It is difficult enough to get a pure bred horse when only two traits are involved in the hybrid ancestry; but when a half dozen, or more, are wrapped up in the germ plasm it is a task almost impossible to obtain a strain that will breed true. To place the fine horse industry on any thing like a scientific basis, it is necessary to eliminate the hybrid.

So far as is known to this writer, but one earnest and intelligent attempt has been made to evolve a pure bred type of saddle horse. It is to tell of this work and its success that I write this paper. Thirty years ago a young man, J. Gano Johnson, in Montgomery County, Kentucky, undertook to evolve a saddle horse that would breed true to type. He was aware of the distinct breeds of beef and dairy cattle, of draft horses, of hogs and of sheep, so he reasoned that the fine horse is of more value than a sheep. Why not a type of the saddle horse? Even at the time he began thus to reason he was a practical horse breeder, and knew something of the magnitude of the task he was about to undertake; but he did not fully realize, until later years, the extreme difficulty of realizing his ideal. It must be noted that the horse to be evolved had to be the result of hybridization. As a matter of fact, when an analysis is made of the blood lines of the breed produced, it is found to come from four sources. First, the farm horse, second the thoroughbred, third the trotter, and last the Morgan Horse.

The following three sires, each great in his respective line, Johnson chose as the ones to furnish the foundation material for his new horse: Indian Chief, descended from Justin Morgan through Sherman Morgan, Vermonts Black Hawk and Bloods Black Hawk who dominated the show rings of Kentucky for the twenty years preceding his death in 1879. At St. Louis in 1868 he won three firsts; namely for best harness stallion, for best roadster, for sweepstakes for all ages and sexes. In this last contest there were sixty-three competitors. Harrison Chief foaled in 1872, goes back to Imported Messenger through Clark Chief, Mambrino Chief, Mambrino Paymaster, and Mambrino, and was during his day one of the distinguished horses of Kentucky. The third great sire chosen was Wilkes, by Hambletonian 10, the most prepotent of trotting sires. All three sires were of the light harness type rather than the saddle conformation. In the great speed of Wilkes, the soundness, strength and action of Harrison, and the intelligence and refinement of Indian, he believed that he had the essential elements to make a great breed of fine horses. He believed that up to his death Indian Chief was the greatest individual horse that had been bred in America. This opinion is verified by the unique distinction which Indian has of having to his credit a number, through his own quality and that of his sons and daughters, among the great sires of the American Trotting Register, the American Saddle Horse Register, and the Morgan Register. So the descendants of these three were used, drawing on just as little material, from other sources, as possible.

The saddle horse is also a carriage horse. That is to say, the horse which has the saddle gaits, walk, canter, rack and fox-trot, is also trained to trot in harness. It is not enough that the show horse shall be fast at the gaits, but he must also be beautiful of conformation, carriage and style. As a matter of fact, as the fine horse exists at present, he is a most intelligent and a most beautiful as well as a most useful animal.

After studying the available material, Johnson thought he saw points of perfection in the various individuals of his foundation animals, which if properly combined in a horse would make him a perfect one. In the descendents of the three foundation sires there were these qualities: the refined, bony head, the large, mild eye, the neatly pointed ear, the long, gracefully arched neck, high withers, the straight barrel ribbing out to the hips, the short back, the full round quarter well let down, the short sturdy legs, the wide strong bone, the flat foot, beauty, animation, brilliant action, extreme speed, docility and intelligence. The task was one of selection and of combination.

He did not have Mendel's work as a guide. At the time that this work on the new type began, the monumental paper of Mendel had not been discovered, and was not for nearly twenty years afterward. He possessed but little theoretical knowledge of biology, but he knew the points of the horse, and had a clear idea of the type he set out to breed. Dominant and recessive unit characters were unknown—at any rate by such names—yet he had learned by studying the behavior of various traits that some always made themselves manifest in the soma and others did not, but might be passed on by the animal whose body was free from them. His breeding has been done with what he calls "manifested characteristics" and "latent" ones. These, of course, prove to be nothing more nor less than the dominant and recessive unit characters. Without their independent discovery his work would have been a failure. For example, he must have in his horse the flat, strong foot, as contrasted to the narrow "mule" foot. He needed a heavy tail and a water-spout tail carriage. He required the flat, strong bone, rather than the round, weak one. Some otherwise good horses had thick, heavy ears, and in their stead there must be the thin, slender, pointed ear. The lung capacity and the walls of the heart must insure strength and endurance. In short, no point of weakness or of coarseness must be allowed. To make progress the breeder had to learn how these various characteristics behave as they pass from parents to offspring.

Had he depended on the result of the matings which he alone could make the knowledge would have come but slowly. The farm on which all this work was done, is in the very center of the fine horse industry. Every other breeder's results could be and were studied. The same blood lines were being used near by.

The very first conclusion was that the method of continued cross breeding usually practised, would not lead to the goal. The hybrid was essential to mix the ingredients, but when it did that, its usefulness ended. So the first endeavor was to get the same desirable points in both sire and dam, or in other words, to make the qualities pure bred. With the great scarcity of animals of like desirable traits it was however impossible to reach the pure bred condition for any qualities except by inbreeding. There was, and is yet, a deep seated prejudice against the inbreeding of horses. There are even those who consider it morally wrong. These views are exceedingly narrow, yet to go counter to traditional belief is no pleasant experience. His task was all the more difficult because he himself could not foretell just what the results of inbreeding would be on the families in use. Trial furnished the evidence that it was safe to inbreed. By this method groups of qualities were soon secured pure-bred. Just here, I must not fail to say that Johnson could afford to own but few of the great horses whose blood he was mingling. Such horses are very expensive. It was necessary for him to make a living as well as move toward his ideal. This necessitated the sale of many excellent individuals which should never have left the stud. Out crossing in other studs soon dissipated their excellence.

Harrison Chief had two renowned sons, Bourbon Chief and Wilson's King. Johnson bought and brought to Montgomery County the former, Bourbon Chief, using freely these two distinguished sons of Harrison Chief.

The second conclusion to be reached as a result of this work was that the shortest route to the goal lay in the female ancestry and not the male. Stallions are more expensive than mares, and of little value unless mares of like qualities can be had to mate with them. Then, too, it is easy to get the services of a great stallion without owning him. So he determined to develop a line of brood mares, by inbreeding, which should have the points of excellence which he needed in his ideal horse. One of these, Queen, traces through Whirlwind to Indian Chief; and through Gov. Wilkes to both Indian Chief and Geo. Wilkes. While her sire, Red Cloud, was by Indian Chief and out of the dam of Wilson's King. In addi-

GOLDEN KING.

tion to this there were in her ancestry two notable show mares: Daisy Burns, and Bird. This beautiful inbred mare, Queen, was mated with Wilson's King.

From this mating was expected the best horse he had yet produced. He had such an accurate knowledge of every feature, and the source of every quality of both Queen and King that he knew what the result must be. The colt, Golden King, verified every expectation. This animal is not for sale; years of work have been spent to produce him that there might be a stallion who could be successfully bred to a line of mares from that other great son of Harrison, Bourbon Chief.

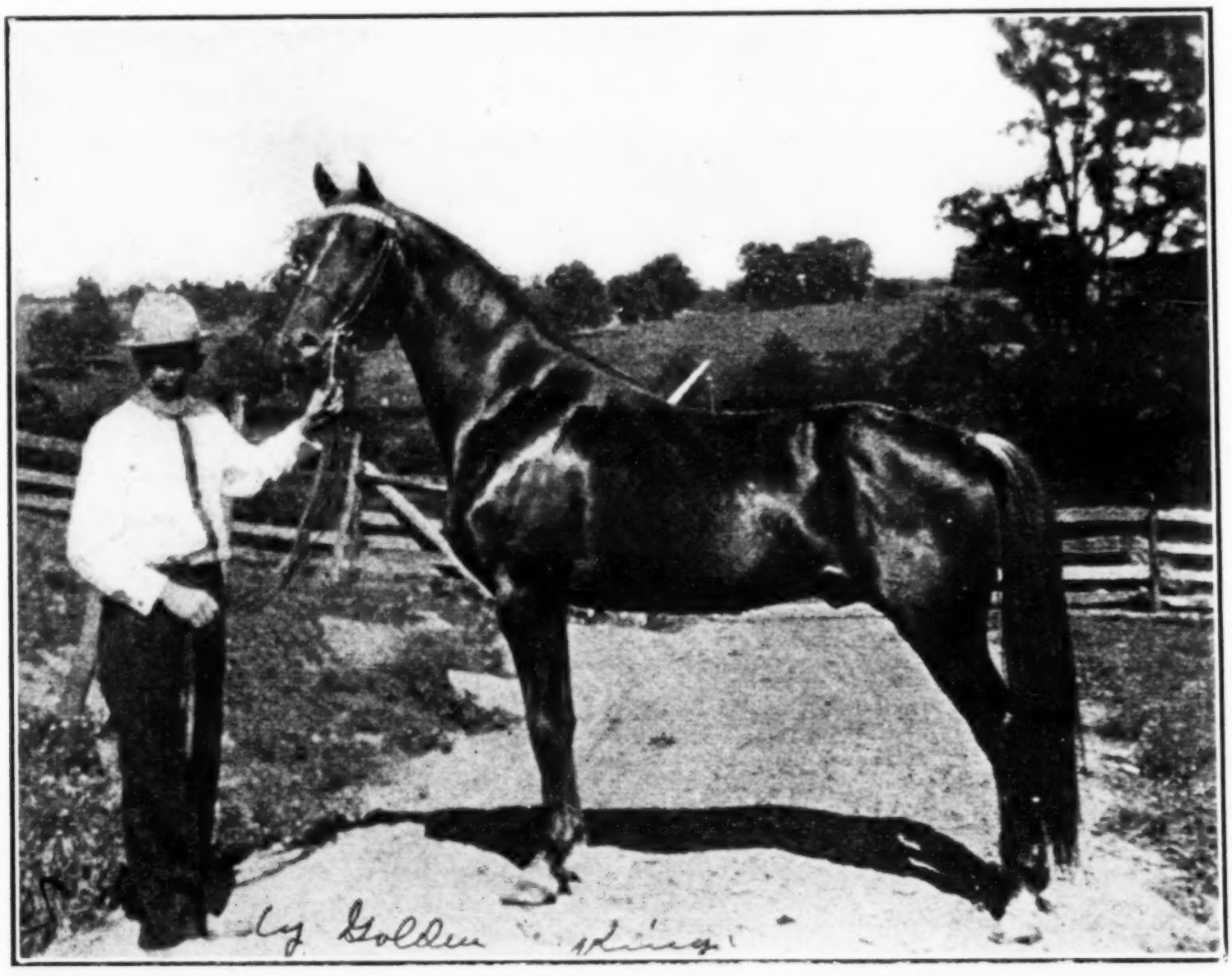
The half brother of Golden King, Cloud King, by Wilson's King out of May Chief by Harrison Chief, is scarcely less famous than Golden himself. Both are show horses, both are successful as sires. To have evolved these stallions alone would have been of but little value to the fine horse industry, unless at the same time a line of mares worthy to mate with them had also been developed. This was done, not only by Johnson but also by others who owned horses of the same blood lines and who believed in the same methods of inbreeding and line breeding. By the time these stallions were ready for service there were many mares pure bred for their qualities, and many more, nearly so. From the pure bred ones and these stallions have come foals of the type. The oldest of these are now producing and their produce are likewise of the type.

The horse of the imagination has been made a reality. There are in this stud a number of sons of Golden King, matured or just maturing, of whom he is the prototype. There are owned by progressive horsemen in Montgomery and surrounding counties many more horses which show considerable resemblance to that type. Thus as a breeder he has rendered a service of great value to his state and nation, by evolving a new type of saddle horse. I call this type the Johnson Horse.

The distinctive features of the type are: intelligence and docility; beauty with most graceful lines; soundness, stamina and strength; height 15.3; short, strong legs set on the four corners of the body; a short back, broad and deep over the loins; long, graceful neck rising out of neatly turned withers; delicate head and sensitive ears; three natural gaits—walk, trot and gallop, the other gaits easily acquired; in action, "The hocks set well up under the body, the knee breaks over in a fold, every joint flexing from the shoulder down in just the right angle to give the utmost roundness of leg fall, every foot falls

in the right place in the right way, all with purity of motion;" in speed unsurpassed; color bay or chestnut. I think I am justified in saying that the Johnson Horse is an improved Morgan, revised and brought up to date: a Morgan, improved in conformation, size, beauty, action, speed, with all the strength, soundness, and endurance of the old Vermont breed.

With permission of Lieut. R. M. Danford U. S. A. the measurements recently made of Golden King are given herewith: "He stands



PURE GOLD BY GOLDEN KING.

15.3, and weighs 1200 pounds. From girth line (just back of the withers) over withers, neck, and forehead to line between the eyes, 53½ inches; across hips, 21 inches; hips to point of buttocks, 25 inches; length of back (from girth line to line joining points of hips), 13 inches; around hocks, 17 inches; around leg below hocks, 9 inches; below knee, 8 inches; girth, 72½ inches; around loin and belly, 73½ inches." The mature sons of Golden King, as Kentucky Golden, Pure Gold, Peter Rabbit, and Young Bill, are so near like him that a stranger finds it difficult to distinguish the sons from one another or from their sire.

The unit characters of the horse may, in a tentative way, be stated to be as follows: that the finer qualities are recessive to the coarse ones; as the thin, pointed ear is recessive to the heavy thick one; the clean, small head recessive to its opposite; the short neck recessive to the long one; the flat foot recessive to the "mule" foot; the calf knee dominant to the straight, perfect knee; strength dominant to weakness; true action and superior action recessive to untrue and inferior action. In color, chestnut is recessive to grey bay and black.

This must be understood as a working hypothesis only. It must be remembered that qualities go in groups. Often a blend of antagonistic traits is a blend only in appearance, and will segregate in a later generation. I have notes made on matings during the last breeding season which, when the foals come, will no doubt throw some light on the dominant and recessive characters of the horse. It may be possible to work out the unit characters of the horse, and to this task the writer expects to devote much of his time.

ORIGIN AND DESCENT OF THE NORWEGIAN BREEDS OF CATTLE[a]

DR. J. FROST
Kristiana, Denmark

In some recent contributions to the publications of the German Agricultural Society, Dr. Dettweiler discusses the origin and descent of certain races of cattle whence the various European breeds of cattle are supposed to have sprung, and reverses what, heretofore, has been the almost universally accepted theory, namely; that the black, black and white, and black spotted cattle were originally the cattle of the primitive Germans, and the red and red spotted cattle belonged to some pre or post Germanic race. The black cattle were usually denominated offhand, Germanic cattle, and the red and vari-colored cattle, the Celtic cattle. Dettweiler, as noted, reverses the positions of these two races of cattle and his statements have so far not been contradicted, according to the best of my knowledge.

In the following I will discuss his theory, with special reference to cattle in Norway, and will show that the theory is applicable also to breeds in that country.

The theory which he advances is briefly as follows:

[a] Arbo, *Den blonde Brachycephal.*

The red breed of cattle are the Germanic cattle and were tamed and bred by the ancient Germans. Long before the Celtic occupancy of western Europe the race of black cattle was tamed by the Celts, somewhere in the interior of Russia, whence these cattle were brought along on their migrations through north Germany, Denmark, and other countries, in which the Celts had settled on dispersing over western Europe. Dettweiler places this immigration of the Celts into Europe at about 2000 years before Christ, or even earlier.

The black spotted Celtic cattle had come into Norway from Jutland. Dettweiler says:

> The appearance of the black color in cattle on the coast of Norway by the proximity of Jutland, is not at all remarkable. Ethnologically speaking, the existence there of a race of people which was a derivation from the pure north-Germanic type has been established; but I do not know whether the area of the expansion of these people covers that of the black and white breed of cattle.

To arrive at a solution of the problem of the derivation of the breeds of cattle in Norway it is necessary to ascertain whence came the first settlers of that country, for the assumption closest at hand is that different races or breeds of cattle were brought thither by various peoples coming there, especially as we know that Norway was settled by different bands of migrants. The first remains found of man in Norway date with certainty to the earlier stone age. Those earliest occupants, as a matter of course, led a very primitive existence. They were mostly fisherman and hunters, and their only domestic animal was the dog.

The Norwegian coasts of those days were rather inhospitable and offered much less favorable conditions for a dense population than today. Therefore, this first population cannot have been numerous, but it spread over almost the whole of the peninsula, that is from south to north and from west to east. The largest settlements were on the southwest coast by reason of people coming there first.

They were members of a race of people which, during the stone period, inhabited the coasts bordering on the North Sea, and without doubt had come there from the south or east of Europe.

This North Sea race of the stone age was characterized by blond hair and round skulls and was apparently closely akin to the Finns of today; it occupied the whole of western Europe from Jutland to northwest Germany, included Holland, and extended clear to Scotland. From Jutland these "blond, round heads" flocked in large numbers to the nearest landing places on the south and southwest coast of Norway, and from there pressed forward north and east.

At the close of the early stone period the inhabitants of southern Norway gradually took to agriculture and cattle husbandry and all the more fertile valleys became populous and well settled by a permanent population.

Whence came the first horses and cattle to Norway is still a matter of conjecture. However, there is much in favor of the supposition that the immigration of the before-mentioned people of the early stone age was not a sudden movement, but took place in successive periods and that these immigrants brought their domesticated animals from Jutland or Friesland. Among these was also the horse, which at that time was common to all the territory adjacent to the North Sea, and was related to the horses of the primitive Finns, and not, as is generally asserted, the Celts. From this horse has descended the Fjord horse of today. It is a small horse which is closely related to the horses which are being bred in Ireland, the Hebrides, the Shetland Islands, the Faroe Islands, and Iceland. The Fjord horses, as indicated by the name, originated in Norway on the Fjords of the western coasts which, during the stone age as before explained, were inhabited by a people belonging to the North Sea race.

In the eastern portion of Norway, that which was inhabited by an ancient Germanic population, was bred an entirely different breed of horses, which might be designated as the northernmost branch of the Occidental horse. It is the same horse which has in Denmark developed into the present day Sudlander, in the adjacent portions of northwest Germany into the Marsh horse, and in Holland into the Friesian horse. In Norway the best and most typical representatives of this breed of horses, are the "Gudbrandsdaler."

Just as the Norwegian horses may be divided into two large groups, namely, those of Germanic and those of non-Germanic origin, we may similarly group the breeds of their cattle. The first cattle in Norway, as the first horses, were owned by that North sea race of the stone age, which sometime probably brought them along from the interior of what is today Russia. In color those cattle were black or black spotted, and are presumably the ancestors of the black and white cattle which may at the present time be found in the countries of northwest Europe.

Jutland is assumed by Dettweiler to be the source whence the black-and-white cattle came to Germany and Holland within comparatively recent times and even to different sections of Norway in earlier (prehistoric) times. There is much to be said in favor of

this assumption as it is fairly definitely established that the inhabitants of southwest Norway had come from Jutland.

The year 1750 B. C., approximately, marked the beginning of the bronze age in Scandinavia. There is no evidence that a new race of people had come into Norway at the beginning of the bronze age, instead, the civilization of the people of the stone age advanced slowly into that of the bronze age. Agriculture played an important part, and about the same domestic animals were kept then as are kept today.[b]

Toward the end of the bronze age and at the beginning of the iron age there seems to have taken place an immigration of Celts into Norway. In ancient remains, forms of skulls characteristic of the Celts have been found, and similar skull formation may be found there among the living, at the present time. Arbo, the eminent Norwegian specialist in skull measurements calls them the "black round-heads" in contradistinction to the considerably older "blonde round-heads." The former are rarer than the blonds but they occur less localized.

Little is known of the earlier periods of the iron age, whose beginning is generally estimated at about 500 years B.C. The oldest finds, dating from the iron age, point to the Celts as having occupied middle Europe during those last few centuries before Christ. Therefore, it was not Celts who had bred cattle or introduced cattle husbandry to any appreciable extent into Norway as raising and breeding of cattle are of much older standing than the immigration thither of Celtic elements. For Holland as well as Belgium I have been able to fix the time of the Celtic immigration at as late as the last centuries before Christ.[c] A safe assumption is therefore to credit the first Norwegian breeds of cattle and horses as well as the first breeding operations to the so-called North Sea race of the stone age.

It is true, further, that the cattle coming from Jutland to the west coast of Norway were black-and-white spotted and black, as the majority of their decendants have remained till today.

Wherever, in Norway one finds descendants of the blond haired and round skulled race, which in the stone age had settled south and west Norway, one may come across the black, gray, and black or gray spotted cattle, all the way from the province Jaderen south of Stavanger, clear up to the Lofoten with the exception of a few scattered red cattle, in portions which demonstrably were settled

[b] Schetelig, *Vestlandetz äldste Kulturhistorie.*

[c] Frost, *Agrarversammulung and Landwirtschaft in den Underlanden, in Belgium.*

by the Germans before mentioned. Such is, for instance the case with the country around Drontheim.

The majority of and the most typical of Norway's population today, is blond, tall and blue eyed, having the long skulls of the true north Germanic race. These ancient Germans originally came to Norway from the east or the south-east but the time when this occurred is unknown. It is supposed that this so-called north Germanic race occupied nearly all of Sweden in the early stone age, while according to Arbo, their appearance in Norway, in the iron age, occurrred 2000 years later. It is probable that their advance into Norway during these 2000 years took place by degrees. They came there as families and kinship groups carrying on farming and cattle breeding. They chose the best and most fertile valleys, conquering and driving before them the resident population and converting the best and most productive portions of the country into more or less purely Germanic colonies. They brought with them their horses and their red cattle, which without doubt they had bred in their Swedish home for thousands of years before.

If it be true that a north Germanic people lived in Sweden as early as the earliest stone period, it is most plausible to accept with Dettweiler and Holdefleiss that the red Germanic cattle descended from a species of bovines which was first tamed, domesticated and bred in Scandinavia, and that the Scandinavian breed called the Fjell cattle is one of the purest and oldest of breeds.[d]

The descendants of the red Germanic cattle are now in evidence wherever, in Norway, the preponderance of the population is descended from that ancient Germanic people, as for example, in all the valleys of eastern Norway; in Osterdal, Gudbrandsdal, Numeda', Glommental, Satersdal, as well as the whole of the province of Telemarken, in Drontheim and in the colony of Osterdale peasants in the extreme north in Bardu and Maalselovdal.

In course of time a great number of other and different breeds of cattle came to Norway either in herds which the immigrants brought with them, or as individuals which the Vikings brought back as booty from their raids. Crossing and greatly differing environment brought forth several different types or breeds of cattle which we find in Norway today.

For purposes of improvement of the native cattle much breeding stock has been imported during the past century; notably, Ayrshires.

[d] Holdefleiss, Uber die Herkunft und Systematik unseres Hausrindes. *Illus. Landw. Zeitung* 28: 10, 1911.

Notwithstanding that a certain amount of blurring of the original race characters took place in the course of the thousands of years past, the distinctive features of the various breeds (or races) have maintained themselves in Norway more completely perhaps than in other countries. High mountains, broad streams and deeply cut fjords interposed the most difficult obstacles conceivable to communication between even adjacent districts and thereby prevented any extensive and general mixture of the original breed characteristics.

Norway is a particularly profitable field of study for the ethnologist, because the different racial elements which originally took part in settling that country, have maintained themselves in a comparative state of purity and distinctiveness to this day and the same is true in even a greater measure of breeds of cattle.

Dettweiler's theories cannot be demonstrated as absolutely true; they are hypotheses just as are the foregoing statements concerning the original settlement of Norway in prehistoric times. But as all the facts regarding the first men, the first horses, and the first cattle in Norway cover each other to a remarkable degree, we feel justified in accepting the correctness of Dettweiler's theory of a red Germanic breed of cattle and of a black post-Germanic breed of cattle.[e]

[e] *Mitteilungen der Deutzchen Landwirtschs-Gesellschaft.* No. 53, 1911. Translation by Mrs. O. S. Knorr, Washington, D. C.

EDITORIALS

THE PEDAGOGICS OF EUGENICS

One of the marvels of the new century is the rapid popularization of the subject of eugenics. In 1906 when the secretary of the American Breeders Association announced the intention of organizing a committee on eugenics a large part of the daily press treated the matter with levity and ridicule. But the public viewpoint has undergone a radical change, in no small part due to the work of the Association. Now, in all the substantial popular magazines and even in daily papers, appear articles which in subject matter are quite as progressive as those admitted to the Association's own publications. The facts presented by such Association workers as Dr. Davenport, Dr. Goddard, Dr. Rodgers, Dr. Southard, and others in this country and in Europe by Galton, Mudge, Reid, Ploetz, Pearson and a host of others have been so convincing that the new subject has already won its field; and the movement to know man's heredity and to utilize this knowledge in producing races of higher efficacy and capabilities, has suddenly become world-wide. The Association, having assumed responsibilities in helping to guide the eugenics movement in safe channels, is itself just beginning to comprehend the magnitude, the importance, the complexity and difficulties of the task. Suggestions are arising from every standpoint. The public, having accepted as a fact that there is need of reforms, is ready for instruction and guidance. The policy of the Association has been to investigate vigorously rather than to preach; to learn the truth and allow the truth to be its own power. As a group the members of the Association have chosen the rôle of researchers rather than that of propagandists. We have amply proven that our point of view is that of true science. The country has taken us at our word. We have gained a respectful hearing from the intelligent people of the continent.

In the meantime eugenics has come to be the subject of popular discussion, of collegiate instruction, of legislative enactment. It seems, that the era of instruction, of advice, of defining public and private policies, of the practice of scientific eugenics had made an earlier advent than the most optimistic propagandists thought possible. Those who have had the foresight to see this new field of service, and had the courage to break its virgin sod, had hardly time to look back in the furrows, when they were confronted with the need of

being teachers and leaders of the popular side of the movement, as well as of its research problems. The Association officers and workers, in meeting the double task are in part ready to rise to the tasks which are rapidly multiplying. But the field grows so rapidly day by day and month by month, that the number of workers must be multiplied.

The avenues for giving expression to the results of the research of the growing number of investigators banded together under the eugenics section of the Association must be enlarged. And workers must be trained to teach. The pedagogics of eugenics must be wrought out in the departments of our universities and colleges, and from there carried to our secondary schools and through college extension departments to all the people. And it requires no special vision to see that genetics, that is, heredity and the breeding of plants, animals, and men, is to become one of the most vital of the truly cultural subjects of our educational system. Our eugenic investigators need to be broadly and intimately in touch with those who are to develop the pedagogy of this subject, and the teachers must constantly sit at the feet of those engaged in research. There is a rapidly growing need for the enlargement of the publications and other popular activities of the Association, such as exhibits at state fairs and national and international expositions. Persons fully trained in the known facts and in giving them through public address aided by charts and stereoptican illustrations will be needed long before the universities will have had the foresight, enterprise and the time to produce them.

Without assuming the rôle of alarmist, it must be admitted that this subject is sure to drift more or less for a lack of adequate leadership. The breeders of plants and animals will serve largely as conservators of sensible, conservative and practical theories, but if fads do not arise it would be because this subject is unlike any other unripe subject. And the appeal cannot be made too strongly to the governing boards and those in executive authority in our universities to grapple with this subject at once that leaders may be produced in adequate numbers. The old theory that the function of our educational institutions was simply to give men general training has drifted upon the rocks. Modern division of labor has created the demand that men and women be trained for the specific kind of leadership required to care for the problems now demanding solution. If any university president doubts the oncoming of eugenics as a field for vital university service, not merely to the university man, but through university trained experts to the community, let him

scan the literature of the subject in 1905 and then in 1912. The Association's publications need a radical change in policy, that they may deal with the instructional and the popular phases of the subject as well as become repositories of the research work of Association investigators. While the first need of the results of research is to make them available for other investigators, yet the ultimate and broad purpose is that this information may be available as a basis for practical plans of race development.

The Association was conceived in part to bring together the research worker, the practical improver of species, and the educator. The sudden growth of eugenics into an educational and even a popular subject has greatly enlarged and intensified the need of this function of coördinating the results of all workers and of giving them all the composite breadth of the view of the whole genetics movement. In the critical work of popularizing eugenics the coöperation of those persons trained in creating new values in plant and animal heredity are needed. And on the other hand the rapidly developing philosophy of eugenics will help in the more detailed work of the producers of new varieties of plants and of improved families and breeds of animals. But the great need is leaders, and the call is to our great universities to train a scientific, safe, and sane leadership which through eugenics, education, and religion, can develop a stronger human race.

THE AMERICAN BREEDERS ASSOCIATION AND THE PRACTICAL BREEDER

The American Breeders Association has a most vital relation to the work of the thousands of national, state and local associations, which are composed of persons engaged in the breeding of pedigreed animals and plants. These live stock breeders associations, also organizations of horticulturists, nurserymen, seedsmen and plant breeders, for the most part stress the commercial rather than the scientific aspects of their business. They lay stress mainly on the work of multiplying plant and animal stocks for general use.

The American Breeders Association on the other hand has set itself to the task of giving emphasis to research work in heredity. We need more exact knowledge, as a tool to work with. The American Breeders Association also emphasizes the more definitely creative phases of producing new values, the origination of new types with added values, and the improvement of existing breeds of live stock

and varieties of fruits, vegetables and flowers. A third general function of the Association is to popularize the results of scientific research through its publications and to take such knowledge forth to the largest number of breeders possible. It will be seen, that the scope and work of these state breeders associations and that of the American Breeders Association are mutually inclusive, the interests of each include those of the other. The two are not in competition, but are supplementary to each other, and should be intimately and widely in coöperation. The American Breeders Association, through its annual meetings, its bound annual reports, and its quarterly journal, the *American Breeders Magazine*, endeavors to center thought upon the broader features of genetics and practical breeding. These publications follow with close attention the results of genetic research in America and abroad. They emphasize the large economic values which arise from the improvement of the heredity of our great wealth producing crops and breeds of live stock. They discuss in the light of modern science of heredity, the methods by which great leaders in breeding have secured their substantial results. They place, besides all these discussions, the larger phases of eugenics in their economic and social relation.

MANY GENERAL BREEDERS ASSSOCIATION

The numerous associations of practical breeders are coming to deal more with the theory of breeding. The trotting register associations, the advanced registries of dairy breeds, the cow testing associations, and the circuit breeders associations, are examples of a tendency to follow out science in a statistical way in building up families of exceptional breeding value within the respective breeds. Field crop breeders associations, horticultural societies, florists societies, and associations of seedsmen and nurserymen are gradually paying more attention to scientific discussions in their meetings and conversations. But in the end the great work of all these organizations is to take the products of the creative breeder and to multiply and bring into wide use the new family of this breed or that, and the new variety of plants. Thus, thousands of Shorthorn breeders have multiplied the "Scotch" cattle brought them through the genius of Cruikshank. N. H. Gentry built up and also widely multiplied his Berkshires, but in the latter work he had thousands of expert swine breeders as helpers. Burbank finds and creates new forms, but the seedsmen and nurserymen are the multipliers and purveyors of his

new things. Experiment stations put out new varieties; and seed growers, seed dealers and nurserymen become agencies to multiply them so that eventually they come within reach of all growers.

Until recent years the science of breeding was in a very undeveloped form, and it is even now very incomplete. But it is a lusty youth and the time for a new order of things has arrived. The practical breeder can now ill afford not to know the widening knowledge which relates to his business. He needs the knowledge and skill of the scientist. We are rapidly getting rid of our old breeding superstitions, of knowledge of things that are not so and breeding is being placed on a firm basis. It will pay the practical breeder to study the present status of the knowledge of heredity, and to keep abreast of advancement along this line. It will pay him for economic reasons, that he may the better use the best materials available in his own breeding work. But beyond that it will pay him for the substantial pleasure and personal development he will receive from this study, as it is being cleared up through research and practical experience.

THE FIELD OF THE AMERICAN BREEDERS ASSOCIATION

The American Breeders Association first sought out and secured in its membership the genetic scientists and the creative breeders of this country and many from other countries. It now desires to enlist under its banner the practical breeders also. The genetic scientists and the creative breeders number only hundreds or at most a few thousand. The practical breeders of live stock, including the no less important ones of poultry and bees, are numbered by the hundreds of thousands. The American Breeders Association will come into its larger purpose, work and influence only when its membership numbers by the tens of thousands these practical technicians who breed and multiply pedigreed animals and plants.

Its thought and influence will reach all countries of the earth for that which is interesting, new and vital in connection with genetics. It will make plain to the laymen the theory of heredity. It will interest legislators in putting forward scientific supervision for creative breeding in coöperation with the practical breeders. It will lead the public press in the discussion of the genetic improvement of the human race. In fact if our enterprising breeders of pure blooded stock and our plant breeders, seedsmen and nurserymen knew how much the association is already doing they would all want to share in the inspiration and results by being members of the Association and thus become subscribers to its publications.

The fact of having brought the students, scientists of heredity and the practical breeders together in a large national organization is an achievement worth all it has cost on the part of the members and officers in money, patience and loyal effort. The placing of the leadership of eugenics in this country in the hands of scientific committees, and the development of scientists in genetics is an outcome of this general plan which is worth all the Association will cost in a generation.

BREEDERS ARE MULTIPLIERS AND BENEFACTORS

The so-called breeder of live stock, even though he does not improve upon the purebred stock he breeds, but only maintains its good qualities, is a public benefactor. He multiplies this stock in its purity and supplies it to stockmen and farmers who thus use pedigreed or upgraded stock where otherwise only mongrel and indifferent live stock would be used. The breeder of purebred animals, needs to know the fundamentals of heredity, or, as we now call it, genetics, that he may secure, multiply and distribute that which is really superior; not merely in looks but in net profits per herd. It does not make one a breeder to pay unduly large prices in the excitement of the sales ring, nor does a long list of entries of his stock in a national herd book. A breeder to be worthy of the name needs to know how to select a foundation of cattle which, when he multiplies them for his farmer patrons, will give the farmer larger net profits per farm herd. Mere show of a few highly fed animals is too often accepted as the badge of scientific success as a breeder. While shows have a large place, winnings of phenomenal animals do not give such a basis for genetic values as do data of individuals tabulated into family averages. The time has come when such science as is coming forward from the researchers and practical members of the American Breeders Association will help the practical breeder to disregard mere show and to build up herds of the best available practical stock whether for meat, work, milk, wool, or for a combination of two or more of these purposes.

The science of breeding is beginning to take rank with the sciences of chemistry, physics and botany. Men have learned how to investigate heredity and breeding. This magazine appeals to breeders to become members of the American Breeders Association. It needs them and they need it. Good can be both received and given.

NEWS AND NOTES

ANOTHER INSTANCE OF BAY FOALS FROM CHESTNUT PARENTS

Another instance of bay foals produced by the mating of chestnut parents is to be found in the catalog of the Algeria Stud Farm, which was located at Erie, Pennsylvania, until its dispersal occurred. The catalog of 1889 of this great stud of thoroughbreds gives the produce of the chestnut mare Monopoly as follows:

Produce

1881—Missed to Voligeur.
1884—b f, by Versailles.
1885—b f, by Versailles.
1886—b c, Jake Miller, by Rayon d'Or.
1887—Missed to Rayon d'Or.
1888—b f, Exclusion, by Rayon d'Or.
1889—ch c, by Rayon d'Or.

Rayon d'Or was a chestnut stallion, and it will be noted that two of the three foals Monopoly produced by that horse were bay. This would indicate that the theory advanced by a scientific writer in a contemporary recently that the chestnut color in horses was a recessive color, and that it would always be the result of mating of sire and dam of that color, is entrely lacking in foundation—*The Horse World*, May 21, 1912.

A PERTINENT EUGENICS QUESTION

The Darwinian theory is based on what Herbert Spencer has aptly styled "the survival of the fittest." This theory is so well known that it is not necessary to enlarge upon it. In investigating insanity and degeneracy in Massachusetts, Dr. Southard found twelve towns which he characterized as a "eugenic group" and which he found to be decreasing in population, and twelve other towns which he brought under the heading of "cacogenic group," and which he found were increasing in population. Does this mean that the "cacogenic" population represents an advantageous variation and the "eugenic" population a disadvantageous variation? There is food for thought here. Is the American Breeders Association endeavoring to bring the entire population of the east into the dying-out group, or is it

aiming only at the white man? Or, more restricted still, is it seeking only to set up in America a modern example of the fading-away process which characterized Babylon, Egypt, Greece and Rome?

It is quite true that many members of the Association have earnestly advocated a more numerous progeny by eugenic individuals, but are these members themselves raising families of six or eight children or are they only advising others to do so? It is fairly well established that, counting accidents and celibates, an average of three children to each marriage barely maintains the population stationary. Let those members of the Association who have families of four or more children raise their hands.

If there are any members of the Association who are not raising as many as four children, or who are not in a fair way to do so, do they recognize any disadvantageous variations in their cases? If so, what are these disadvantageous variations? It is more important to know the reason why people who may be fairly classed as part of a eugenic population, do not increase in numbers by propagation, than it is to study the causes of insanity. We will never get anywhere by random shots in the air. We must ask those who fail to reproduce their kind why it is that they fail. They should answer fully and frankly. It is their duty to their fellow men to do so. Doubtless many of those who fail to produce a reasonably numerous offspring would not like to make public the real reasons for their failure. Well, Dr. C. B. Davenport is collecting statistics on human beings, and what he collects appears only as statistics. This is an appeal to members of the Association to send real reasons to Dr. Davenport to the end that he may tabulate them and tell us what is the matter with the eugenic part of our population.—C. L. REDFIELD.

ORGANIZATION OF A EUGENICS CLUB AT CORNELL UNIVERSITY

Last March, some students at Cornell University, who were interested in the eugenics movement, decided to form a club for the study of eugenics. During the same week, but unknown to them, the Cornell Philosophical Club had passed resolutions hoping to bring before the "various organizations within the university likely to be interested in eugenics," their desire to establish "a society whose aim it shall be to promote the study of the laws of inheritance and of eugenic agencies, to disseminate information about such laws and agencies, and to arouse interest in them wherever possible within

the university community." The result was that a general meeting was called to effect an organization. On short notice a large audience gathered on March 26th to hear Prof. H. J. Webber, of the Department of Experimental Plant-Breeding, give a lecture on eugenics. On that same evening the society was organized, and the following officers were elected: President, E. G. Boring; vice-president, H. B. Switzer; secretary, E. E. Barker; treasurer, L. R. Koten.

The membership of the society was drawn from various parts of the university community, and in view of this diversity of interests represented in the membership, as well as because of its large numbers, the society was divided into several subordinate study-groups. Each group is designed to consider eugenics in a different aspect, the biological, psychological, sociological and economical, and so on. Each group meets independently, elects its own leader, and outlines its own course of work. These meetings are held once a week. The chairmen of the various groups, together with the president, vice-president, secretary, and treasurer of the Society, form an executive and program committee, whose function it is to direct the general affairs of the society, and to arrange a program for each of the common meetings of the society as a whole, which occur monthly.

At a second public meeting of the Society, held on August 16, Prof. S. H. Gage, research professor in the college of medicine, made an address, and President J. G. Schurman added remarks endorsing the movement in behalf of the university. The audience filled one of the largest lecture rooms on the campus. Interest in the movement is quite general, and membership is open to all persons. A considerable number of the members are women. The officers, however, are restricted to members of the university who are registered students.

The eugenics society at Cornell is ready to ally itself with other local organizations for the promotion of the eugenics movement.—ARTHUR W. GILBERT.

PROGRESS REPORT FROM THE UNIVERSITY OF WISCONSIN

I have just received from someone a clipping telling of the organization of the Cornell Eugenics Club. The Eugenics Club of the University of Wisconsin rejoices in the founding of this sister society.

We began with about 50 members and an attendence of 75. At the session last Saturday night we had an attendence of 300 and our membership has now risen to nearly 150. We meet every two weeks,

generally alternating reports on some line of research by the members, with addresses by members of the faculty on eugenic subjects. The literature committee has almost finished a classified list of eugenic literature, together with a statement of the purposes of the movement, which is to be published as a bulletin by the Extension Department of the University for distribution through the state. The research committee is engaged at present in an investigation of the size of families of college professors, a rural township, a labor union, a group of business men, the tuberculosis patients of the city, and the applicants for relief from the Associated Charities, the individuals in each case also reporting upon the families of their fathers and mothers, brothers and sisters in other occupations, and similar data for the wife. We are trying to make it adequate from both a biological and sociological viewpoint. We had a report some time since on eugenic legislation in the United States, and another on insanity in Wisconsin, the first especially surprising us in the extent of legislation already enacted on the subject. It has just occurred to me that a summary might be of interest to readers of the *Breeders Magazine*.—O. E. BAKER, *Madison, Wisconsin*.

THE VALUE OF SEEDLING CHARACTERS IN PLANT BREEDING

A distinction is made, for the purposes of plant-breeding, between desirable dominant and recessive characters. Once we have a plant with a desirable recessive character or characters, it gives us pure seed for the next season's planting. While if we have a plant with a desirable dominant character, we do not know whether it is pure or not (except in those cases where the homozygote can be distinguished from the heterozygote), and have to sow the seed and wait a year to find out. But if we have studied the seedling characters, and any of them are found to be connate (that is, *born together*) with the mature character in question, then we can pick the pure dominants from the second or any subsequent generation from a cross with as little loss of growing time as the recessives.

A selected strain of *Stizolobiums* was found, in the third generation from the cross, to contain a recessive factor which caused the young shoots and pods to be covered with a close black tomentum instead of the usual whitish pubescence. These black plants were all late-flowering. The pure dominant plants were selected without any loss of growing time, and at a minimal expense, by sowing separately in a cold frame, early in the season, fifty seeds from each of the plants

with the dominant character. In two weeks it was obvious, from the colors of the plumules, which of the lots of fifty were free from the recessive black. In the same strain there were reasons for thinking that the albino condition (in which purple color is absent from the whole of the plant) was less vigorous than the dominant purple-flowered. (Erwin Baur also found the albino *Antirrhinums* to die in greater numbers than the colored plants. Compare his admirable genetic monograph in *Zeitschrift fuer inductive Abstammungs und Vererbungslehre,* iii: 70. 1910.) The purple-flowered plants have purple-stemmed seedlings. Thus by sowing fifty seeds each from a number of plants of this strain, we can readily find the plant or plants all of whose seedlings have both purple epicotyls and whitish pubescence on the plumules. These will breed true to both dominant characters, and will have been obtained without loss of time. Such a test can readily be carried out in the winter season, by sowing the seeds in flats.

The larger the mature plants are, the more important is the study of the seedlings, because of the expense of growing to maturity many lines which will have to be rejected. This is especially the case in breeding shrubs and trees. (For instance, one may notice seedling characters in the mango and guava which are possibly connate with definite qualities of the fruit.) I am convinced that in the future it will pay the scientific plant-breeder in some cases to make a microscopical and chemical study of the seedlings, to learn what seedling characters are connate, in the strains with which he is working, with desirable dominant characters of the mature herb, shrub, or tree.—JOHN BELLING, *Gainesville, Florida.*

THE FIFTEENTH INTERNATIONAL CONGRESS ON HYGIENE AND DEMOGRAPHY

This Congress will be held in Washington, D. C., September 23 to 28, 1912. The preliminary announcement which, by-the-way, is printed in three languages, English, French, and German, contains part of the program which is elaborate and extensive. The work program takes up its two divisions: Hygiene and Demography, these divisions consisting of eight and one sections respectively, and each section having its own program. This convention is of considerable interest to eugenists by reason of the close relation of its subject matter to eugenics. Dr. C. B. Davenport and Dr. Raymond Pearl will read papers before the sub-section of sex hygiene.

PUBLICATIONS RECEIVED

ATHLETIC SUPERIORITY OF OUR NEW STOCKS. Lieutenant-Colonel Chas. E. Woodruff. Reprinted from the *Medical Record*, April 27, 1912. Pp. 10.

MODERN VITALISM. Chas. E. Woodruff, M.D. Reprinted from the New York *Medical Journal*, August 26, 1911. Pp. 41.

THE PRODUCTION OF NEW AND IMPROVED VARIETIES OF TIMOTHY. Herbert J. Webber in collaboration with Thomas P. Hunt, John W. Wilmore, Charles F. Clark, Samuel Fraser. Bulletin 313, April, 1912. Pp. 338 to 392, illustrated with 10 plates.

THE CANADIAN SEED GROWERS ASSOCIATION AND ITS WORK. Address delivered by Mr. L. H. Newman, Secretary of that Association, before the Select Standing Committee on Agriculture and Colonization, February 6, 1911–12.

COÖPERATIVE TESTS OF CORN VARIETIES. Evvard R. Minns. Bulletin 314, April, 1912, Cornell University, Agricultural Experiment Station. Pp. 394 to 412. Illustrated.

THE HEREDITY OF SIZE, SHAPE AND NUMBER OF TOMATO FRUITS. B. H. A. Groth, Ph.D. Bulletin 242, New Jersey Agricultural Experiment Station, Brunswick, N. J. Pp. 401, pls. iii, 7 text charts.

THE VITALITY OF REPRODUCTIVE CELLS. Lowery L. Lewis. Bulletin 96, December, 1911, Oklahoma Agricultural and Mechanical College. Pp. 47, 7 text figures.

ANOTHER SEX-LIMITED CHARACTER. Ed. N. Wentworth in *Science*. June 28, 1912. Pp. 986.

THE WOMEN OF TOMORROW. William Hard. The Baker and Taylor Company, New York, 1911. Review will appear in a later number of the *Magazine*. Pp. 211, illustrated.

NEW BOOKS

EINFUHRUNG IN DIE EXPERIMENTELLE VERERBUNGSLEHRE. Prof. Dr. Erwin Baur. Gebr. Borntraeger, publishers, Berlin, Germany. Pp. 293, 7 x 11 inches, 80 text figures, 9 colored plates.

The volume of Mendelian literature is continuing to grow at an amazing rate. One of the more notable recent contributions to this literature is by Prof. Dr. Baur, professor at the University of Berlin, Germany, a book in German under the title of *Introduction into the Study of Experimental Heredity*. This book grew out of a course of lectures delivered at the University of Berlin. Although the lecture form has been retained the subject matter has not suffered in arrangement.

The results of a most extensive series of original experiments by the author in breeding and hybridizing enter into these lectures. Most of these experiments have been with Antirrhinum or Snapdragon and have not previously been published.

From these cross breeding experiments is also drawn a large part of the material for the numerous drawings and colored plates. The illustrative material is drawn from the plant and animal world according to the author's needs but in the main examples from plant breeding preponderate.

The author does not allow himself to chase theories, nor does he place over-much value on untested theories of others. Baur does not attempt to explain disputed cytological processes and does not admit adherence to any school or theory of the mechanism of heredity. His work is exactly what the title says it is; an introduction into those phases of heredity which are capable of experimental demonstration. Doubtful processes and hazy theories are in every case simply and sensibly referred to the future for more complete research and study. Thus the transmission of modifications is disposed of as follows: "Summa Summarum up to the present not a single case is known, which might be interpreted as one of inheritance of modifications." Hence also, the mutations observed by De Vries in Oenothera are regarded with decided suspicion "The unstability of this species is something singular." "The cause of this, undoubtedly remarkable mutability of O. Lamarkiana, we do not know." He punctures the theory of the genesis of new varieties and even of species by direct mutation by citing the "circumstance, that all cases of mutations generally accepted as such, if not in fact all mutations, are such by reason of loss of a single factor, and the new variety on being crossed with the original variety, behaves so that we can without hesitancy assign the difference to the absence of some one factor."

The trend has for some time been away from strict mathematical interpretation of factoral processes and this is evidently supported by Baur. Those who have been figuring over interminable formulas of correlation tables may question themselves if their mathematical endeavors have yielded results commensurate with the expenditure of effort. Baur holds that so called correlation of two or more characters is frequently merely the manifestation of the same unit character in two or more different directions. "Correlation is a concept which under the light of modern research is in process of dissolution."

The economic importance and practical bearing of genetics on the breeding of plants and animals is summed up more tersely perhaps than in any recent similar literature. "Already, practical breeding has become a distinct science, which bears about the same relation to the science of heredity as technology bears to chemistry." It is

only a question of time that all useful and important plants and animals will be analyzed as to their unit characters but this work will necessarily have to be done by technicians in well equipped and well manned state institutions. Actual breeding will probably always be the work of the plant and animal breeders who will utilize these facts and will make it their business to originate and place on the market new forms and new values.

"A matter of far reaching importance, is the investigation of the intimate processes of mutation,—the solution of the question, whether we can give rise to new material, whether under controlled conditions we can initiate new unit characters, which will give us new material for selection in creative breeding. What we know about these things to day is not worth mentioning." The final chapter brings this observation: "The theory of natural selection stands and falls with this: whether or not it will be shown that mutations really occur with sufficient frequency to make possible an effective process of selection."

The conservatism and caution with which this book is written lend it solidity and strength. It is a well rounded publication, calculated to give the student a splendid grounding in the principles of Mendelism. Graduate students, researchers, and advanced students of heredity and breeding who wish to obtain a thorough working knowledge of Mendelism will find this book exceedingly useful.

HEREDITY IN RELATION TO EUGENICS. Dr. C. B. Davenport, Secretary of the Eugenics Section of the American Breeders Association. Henry Holt and Company, New York City. Pp. 320.

This book is a general analysis or broad review of a subject which should be represented on the shelves of every public library, and should be read by every humanitarian, publicist, physician, teacher, parent, and student. This book bears evidence to the fact that eugenics is rapidly accumulating a body of usable knowledge and that its initial period of research may be followed by a permanent period of research, education and application. Eugenics or the breeding of men is clearly placed beside and parallel to eusthenics or the development of man through home, school, and church, as the second great agency for upbuilding the civilization of nations and races.

It is only six years since the secretary of the American Breeders Association organized a committee on eugenics; four years later it was enlarged into a eugenics section, coördinate with its plant section and animal section. At that time no constructive eugenics work

had been done in this country, and the purpose to place the leadership of this subject in the hands of careful scientists has been more than realized. The charlatan and the half-baked scientist is no more to control the public teaching of eugenics than that of engineering, agriculture, or home economics.

Dr. Davenport clearly forecasts the introduction of genetics as a study into our educational system. This is also foreshadowed by the organization of genetic associations at a number of our universities and colleges, and the promise of organization of many more such organizations in connection with the American Breeders Association. In our agricultural colleges the newer genetic principles are being taught in reference to plant breeding and animal breeding; and in a few institutions lecture courses are given in eugenics. Thus these institutions of higher learning are coming into coöperation with this central association in this genetics movement which is gaining a mighty momentum. May we not hope that at no distant date the elements of eugenic fact may become a part of the curriculum of our secondary schools, thus to reach those who compose the body of the millions who work on the land, in the shop, and in the home?

The subject matter treated by Dr. Davenport is so closely related to much that is common knowledge and is so well presented, often with the aid of graphic illustrations, that the laymen will find it both interesting and instructive, and easy to grasp. The preliminary chapters define and state the aim and importance of eugenics, and give some of the more recently discovered facts, and the newer methods in the study of human heredity.

Nearly 200 hundred pages are given to the subjects of the inheritance of family traits and to the eugenic significance of the migration of defective and valuable traits into new territory. Of special interest are the chapters on the influence on the race of certain individuals which have been especially potent in projecting faults or excellencies into a large number of their progeny, as in case of the strong Kentucky families, and in the debased Jukes family.

Dr. Davenport's outlines for state eugenic surveys point out one of the directions in which practical work is being undertaken. In New Jersey and other states these surveys are already under way, with the coöperation of institutions which deal with the defective and criminal classes. The Eugenics Record Office at Cold Spring Harbor, New York, in connection with the American Breeders Association, has reached a point of great importance. That genealogical and other data there collected is already of great value is illustrated by the use Dr. Davenport has made of such information in this

volume. The superintendent, Mr. H. H. Laughlin, who is ably accumulating in a fire-proof vault the available records of lineage and genetic genealogies, invites the coöperation of all interested in either the science or the practice of eugenics. This volume illustrates again the fact that the genetic movement is making substantial progress all along the line.—W. M. HAYS.

REFERENCES IN CURRENT LITERATURE

MARRIAGE OF THE DEAF. Fred DeLand. *Volta Review*, no. 3, June, 1912. Page 186.

HEREDITY AND INTERMARRIAGE, FACTORS IN DEAFMUTISM. Linnaeus Roberts. *Volta Review*, no. 3, June, 1912. Page 184.

UNFIT FOR PARENTHOOD. John Harris. *Westminster Review*, May, 1912. Pages 579–582.

THE CANADIAN SEED GROWERS ASSOCIATION AND ITS WORK. Edited by the Secretary, Mr. L. H. Newman. Ottawa, Canada. Pp. 64, 13 text figures.

This large and useful public service organization, the Canadian Seed Growers Association, has as its object the advancement of the interests of seed growers and farmers in Canada, by exerting such influence and devising such means as will tend to improve the bulk of the forty million of bushels of farm seed which are used annually in Canada, to the end that the per-acre production of those crops may be permanently increased. This pamphlet gives a statement of the organization of the Canadian Seed Growers Association, the general system of seed growing officially adopted by the Association, registration of seed, handling of commercial seed. It further touches on choice varieties, production of "Elite Stocks" of seed, maintaining purity, grading of seed, seed inspection, etc.

We recognize the names of many American Breeders Association members among the administrative officers as well as in the council and directors. The following are the officers for this year: President, James W. Robertson, C. M. G.; vice-presidents, Prof. C. A. Zavitz, G. A. Gigault, John Mooney, and secretary-treasurer, L. H. Newman

ERRATA

The Editors wish to call attention to the following errors in the article, "Methods of Corn Breeding," by Professor Herbert K. Hayes, in No. 2 of Volume III: On page 99 in place of "these types have been called types," read "these types have been called biotypes," and on page 104 in line 5 read "biotypes" instead of "genotypes."

ASSOCIATION MATTERS

THE EUGENICS RECORD OFFICE

The purpose, the work and the importance of the Eugenics Record Office is coming more and more to public notice. As a research institution it is singular of its kind. The facts brought to light and turned into usable knowledge by its research and field workers have furnished the themes and the inspiration of countless lectures, addresses and articles on eugenics the country over.

The social engineer of the perhaps not so distant future, will increasingly draw from this source facts from which to argue, and upon which to base plans for social uplift, regeneration and organization.

The legislator in state and national councils will also come here to get certain basic facts and statistics so essential to understanding the nature of a population, the interrelations of whose component parts are daily becoming more intricate and complex, and where every problem, whether it be one of industry, of education, of health, of immigration, of sociology, ultimately traces back to one of heredity.

MEMBERS AND ENDOWMENT

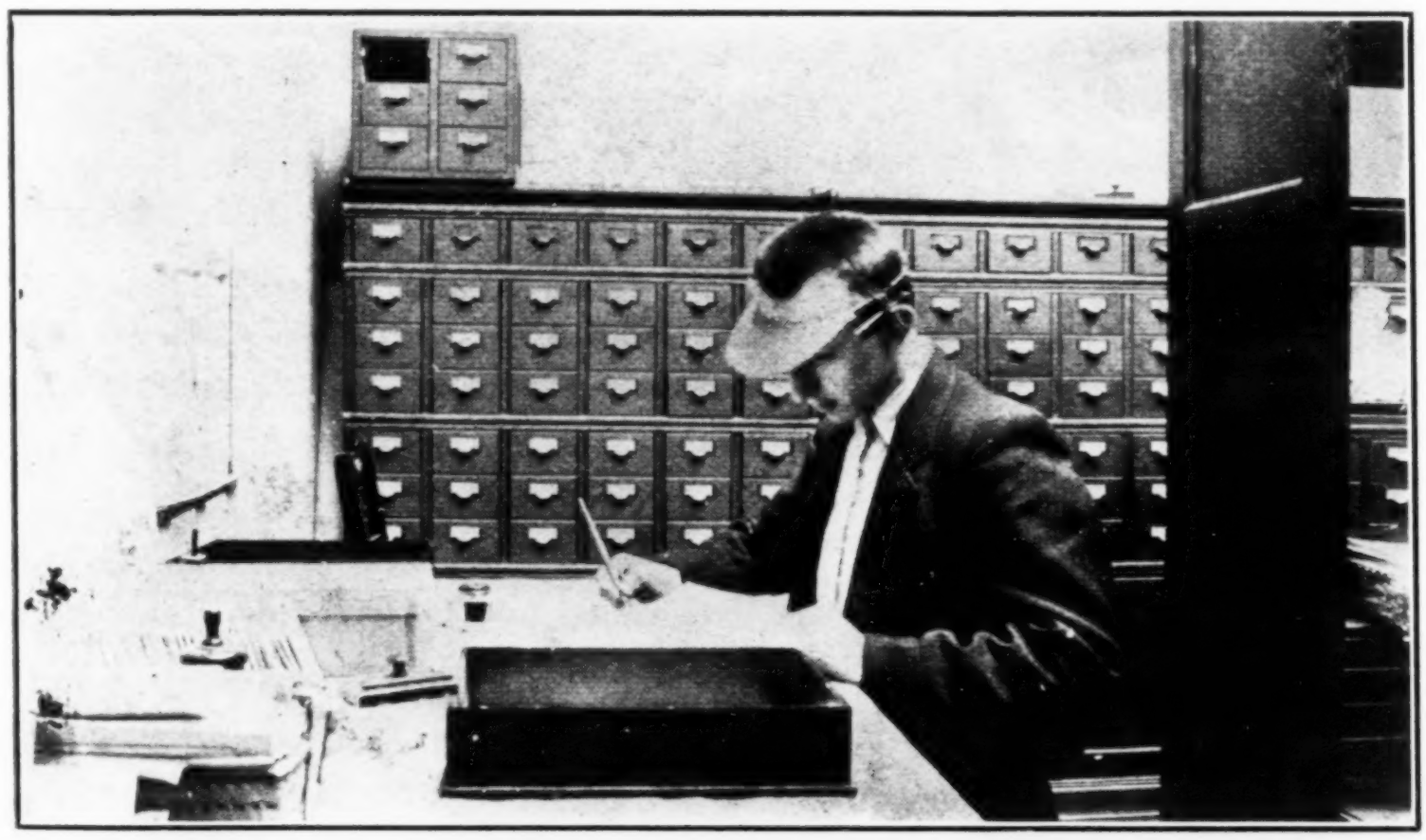
The American Breeders Association has 1690 annual and 197 life members, and thousands of new members are needed. Every member is urged to invite three friends to join and to request the secretary to send them an invitation and a copy of the *Magazine*. The Association has earned a place by the side of other great movements. Has it not earned an endowment? How shall that be secured? The best endowment for this publication would be a large membership: best, because the membership is a living endowment.

This Association is the vanguard of research and creative work in genetics. It has in hand much work which an endowment of money would enable it to carry out. It needs money to bring into the field of public effort a number of things which public institutions are not ready to undertake. It needs means to be devoted to the coördination of the forces working along genetic lines.

The proposition of bringing together the plant and animal breeders was once met with much doubt and even with opposition, but it has proven of very great value. Making possible the placing of eugenics in America in the hands of real scientists was a service of inestimable

HEADQUARTERS OF FIELD WORKERS OF THE EUGENICS RECORD OFFICE, COLD SPRING HARBOR, L. I., NEW YORK.

Here under the direction of Dr. C. B. Davenport a force of twelve field workers is engaged in eugenic research. The workers spend their time in studying the family distribution of specific mental and physical traits.



EUGENICS RECORD OFFICE: INDEXING FAMILY TRAITS.

All data received at the Eugenics Record Office is indexed on the basis of surname, trait and locality in accordance with a system devised by Dr. Davenport.

value. The association of those concerned with eugenics with those working in plant and animal improvement, is proving not only its wisdom, but is of very large scientific value. Who will suggest the sum which should be raised for an endowment? And who will suggest a plan of securing it? And while formulating plans for a money endowment for research in genetics let one and all ask our friends, by becoming members, to become a living membership endowment to the *Magazine*, the annual reports and other publications. Let us set the sum for an endowment at $500,000 or more and work till we get it.

THE MAGAZINE TO OPEN ITS PAGES TO ADVERTISEMENTS

Preparations are being made to change the status of the *American Breeders Magazine* as to second class privileges, in order to enable it to accept advertising matter for publication.

This change of policy will not cause any material change in the *Magazine* except perhaps in appearance. There will be the same number of pages of reading matter as advertising will be placed on additional pages. Complete details will be published in the next number of the *Magazine* when, it is thought, the necessary arrangements with the Post Office Department and the publishers will have been made.

I am glad to contribute to such a good work as you are doing. May you live long and prosper.—C. L. WATROUS, *Des Moines, Iowa.*

I conceive that there can scarcely be anything of more importance than the fostering of a wholesome public sentiment concerning the facts of eugenics. —W. A. BARNES, *Marston, Missouri.*

I consider the publications of this Association the most instructive and useful literature published today and I am convinced that no young man interested in any phase of genetics can afford not to read this literature.—CHAS. MCINTIRE, *Chandlersville, Ohio.*

I regard the American Breeders Association as the most important and influential agricultural association in America and probably second only to the American Association for Advancement of Science in promoting general progress and welfare of the nation—T. V. MUNSON, *Denison, Texas.*

I am tired of your duns for annual membership in the American Breeders Association, so please drop them and make me a life member. Check enclosed. —S. M. TRACY, *Biloxi, Mississippi.*